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PROCEEDINGS

OF

THE SUB-COMMITTEE,

PUBLIC SERVICE COMMISSION.

SCIENTIFIC DEPARTMENTS,

IN

THREE PARTS.

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PROCEEDINGS

OF THE

SUB-COMMITTEE,

PUBLIC SERVICE COMMISSION.

SCIENTIFIC DEPARTMENTS.

PART I.—METEOROLOGICAL DEPARTMENT—
SECTION I.—NOTE BY THE SUB-COMMITTEE.
" II.—*Nil.*
" III.—ORAL EVIDENCE.

PART II.—GEOLOGICAL DEPARTMENT—
SECTION I.—NOTE BY THE SUB-COMMITTEE.
" II.—NOTE BY THE DEPARTMENTAL MEMBER.
" III.—ORAL EVIDENCE.
" IV.—WRITTEN EVIDENCE.

PART III.—ARCHÆOLOGICAL DEPARTMENT—
SECTION I.—NOTE BY THE SUB-COMMITTEE.
" II.—NOTE BY THE DEPARTMENTAL MEMBER.
" III.—ORAL EVIDENCE.
" IV.—WRITTEN EVIDENCE.

Members of the Sub-Committee.

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THE HON'BLE J. W. QUINTON, C.S., C.S.I.

JOHN ELIOT, ESQ., *Departmental Member.*

THE HON'BLE SIR CHARLES A. TURNER, KT., C.I.E., *President.*

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A. REA, ESQ., *Departmental Member.*

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* Unable to attend.

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SCIENTIFIC DEPARTMENTS.

PART I.

METEOROLOGICAL SURVEY.

BENGAL SECRETARIAT LIBRARY

PROCEEDINGS

OF

THE SUB-COMMITTEE,

PUBLIC SERVICE COMMISSION.

INDIA.

Meteorological Survey.

Section I.—Note by the Sub-Committee.

India.

Meteorological Department.

Section I.

It was intended that Sir Edward Buck, Secretary to the Government of India in the Revenue and Agricultural Department, should have attended the inquiry as Departmental member, but unfortunately he was prevented from doing so. It was not considered necessary to impose on him the trouble of preparing a Departmental note, inasmuch as the particulars concerning the Department could be, and were, furnished by the examination of Mr. J. Eliot, the Officiating Meteorological Reporter to the Government of India, who was in charge of the Department.

The Meteorological Department possesses a staff of six gazetted officers. The Meteorological Reporter to the Government of India and the Assistant Meteorological Reporter to the Government of India are attached to the Central Office; four Meteorological Reporters are stationed respectively at Calcutta, Madras, Bombay, and Allahabad. The Meteorological Reporter to the Government of India receives a salary of R1,800. The Assistant Meteorological Reporter to the Government of India, who also performs the duties of Meteorological Reporter for the Punjab, receives a salary of R500 rising to R750, and the same salary is paid to the Meteorological Reporter at Bombay. The Meteorological Reporter at Calcutta receives a salary of R450; the Reporter at Madras a salary of R300 and at Allahabad a salary of R250. The officers stationed at Calcutta and Allahabad are not expected to devote their whole time to the Department; the appointments are at present held by officers of the Educational Department. The Meteorological Reporter at Madras, at present a lady, is expected to devote her whole time to the Department. The salary of R300 attached to the appointment was fixed when the office was held by the Government Astronomer in connection with his proper duties.

The Department has not as yet been so thoroughly constituted that rules have been prescribed regarding the appointing authority; the present Imperial Department was grafted on to existing local Departments: hence it has happened that the appointments at Allahabad and Calcutta are made by the Local Government, and the appointments at Madras, Bombay, and for the Punjab by the Local Governments in consultation with the Meteorological Reporter to the Government of India.

The Assistant Meteorological Reporter to the Government of India was appointed by the Secretary of State, while Mr. Blanford, who holds the substantive appointment of Reporter to the Government of India, and Mr. Eliot, who is acting for him, were transferred from the Educational Department by the Government of India.

Subordinate to the Reporters are a staff of Observers, of whom two only, the Meteorological Observer at Alipore and the Actinometric Observer at Mussoorie, receive a salary of over R100.

The gazetted appointments are all held by Europeans not domiciled. The Observers are supplied by many races, *viz.*,—Europeans, Eurasians, Hindus, Mahomedans and Parsis, the great majority of them being Natives of Asiatic descent. With the exception of the Observer at Alipore, a Bengali graduate, and the Actinometric Observer, a European who devotes his whole time to the work, they receive very small salaries, inasmuch as a portion only of their time is devoted to the work of the Department. Some of them are clerks to Civil Surgeons, Telegraph Officers, clerks in jails, Overseers in the Public Works Department, &c.

Mr. Eliot is of opinion that the Reporters should be good mathematicians and physicists and acquainted with the literature of meteorology of all countries where the science is studied or observations are accurately recorded. Judgment and experience are also, he considers, requisite to avoid hasty conclusions, while at the same time, quickness of inference is necessary especially in forecasting atmospheric disturbances, and particularly those of a cyclonic character. He considers that the educational institutions in this country, owing to their omission to teach modern European languages, especially French and German, in which much of the meteorological literature is written, would not, as a rule, provide suitable officers for employment as Reporters, and that ordinarily they fail to impart sufficient instruction and practical training in science. He admits that there may be exceptional men among those educated in this country, who would be suitable for employment in the higher ranks of the Department, and he instances especially Mr. Ashutosh Mukerjee, though he thinks it doubtful whether the emoluments attached to offices in the Department would satisfy his legitimate ambition. He by no means advocates any rule prohibiting the employment of Natives in the Department, but considers that at present it will be more economical and safer to employ European agency. He observes that in this and in all scientific Departments in India, owing to the smallness of the staff, it is absolutely requisite that measures should be taken to secure the most competent and

India.

Meteorological Department.

Section I.

reliable men that can be obtained for the salaries offered. For the appointment of European officers he advocates selection by the Secretary of State on the recommendation of the Meteorological Council in England. It may be noticed that Mr. Eliot was himself Second Wrangler and First Smith's Prizeman of his year. He was induced to accept employment in India partly because his health required residence in a warm climate, and, whilst in the Educational Department, he undertook work on behalf of the Meteorological Department in connection with his other duties. Mr. W. L. Dallas, the Assistant Meteorological Reporter to the Government of India, was employed for ten years in the Meteorological Department of the Board of Trade in England, and was then recommended by that Department to the Secretary of State for appointment to the office which he now holds.

Mr. Dallas concurs generally in the views expressed by Mr. Eliot as to the qualifications for the higher posts in the Department, and approves of the method of selection which Mr. Eliot recommends. He considers it desirable that officers employed in the upper grades should have the benefit of a European or an American training, and that it is necessary for the maintenance of their efficiency that they should visit Europe periodically and make themselves acquainted with the theories discussed, though possibly not yet published, among the scientific men of the day. It is satisfactory to notice that in Mr. Dallas' opinion the aims of the Department in India are higher than those of the Meteorological Department of the Board of Trade, and that the work is better done.

Mr. Eliot has detailed in his evidence the duties of the several members of the Department. The Observers are required to register observations and transmit them with punctuality to the provincial Reporter and to the Central Office. Each provincial Reporter superintends and inspects the observatories within his Province and tabulates the observations forwarded to him by Observers and sends them on to the Central Office. The Central Office checks these tabulated returns and publishes annual and other reports based on the reduced observations. Storm forecasts are issued by the Bengal Reporter to the coasts of the Bay of Bengal. The Bombay Reporter warns the Bombay coast. The Government Astronomer for Madras has hitherto warned the port of Madras. From the Central Office there are issued daily weather reports and periodical forecasts of a more general character than those which are issued by the local Reporters, as, for example, the forecast of the character of a south-west monsoon rainfall. Among the other publications of the Department there have been issued as the result of fifty thousand observations, obtained in a large degree from logs of ships, weather charts of the Bay of Bengal and the adjacent sea north of the Equator, showing in every month of the year the average directions of the winds, the normal atmospheric pressure, and the specific gravity and temperature of the currents at the sea surface; and the Department is at present engaged in compiling similar charts of the seas on the west of India.

The qualities required in Observers are honesty and accuracy of work and acquaintance with the instruments in use. Instruction in the working of the instruments and in their duties generally is afforded at the provincial head-quarters to all persons who desire employment as Observers.

In this, as in other Departments, the Government of India has shown its desire to secure the education of Natives for employment in the higher grades of the Department. In a letter No. 123, dated 18th September 1884, the Government approved of a proposal to train Natives of the Upper Provinces for the Central Office establishment, and at the same time suggested the training of a Native clerk to perform more advanced work, so that he might be able to carry on the current duties during Mr. Dallas' absence on tours of inspection or on leave. The Meteorological Reporter to Government in his reply No. 147S., dated 14th October 1884, expressed his opinion that the suggestion was well worthy of trial, and, if found practicable, would prove of great convenience. He observed:—"For an experiment of this kind it will be necessary to select a youth of greater capacity than is requisite for ordinary clerical duties, of a good physique and somewhat special tastes. He should have had good grounding in English, elementary mathematics, and some other subjects that are taught in the University B. course; but I do not think that one who has taken his University degree would necessarily be better fitted than one educated up to the F. A. standard, nor would open competition be so likely to secure the kind of man required as the selection by the Principal of a college who has a personal knowledge of the boys under his training." Mr. Blanford consequently proposed to communicate with the Principals of the Bareilly, Agra, and Lahore Colleges, stating the qualifications requisite for the appointment, and to select the most promising among the candidates recommended. He recommended that the selected candidate should receive R50 a month while on probation, but he added, it would be necessary that he should be able to hold out to the candidate the prospect of higher emoluments should he prove his capacity and show himself assiduous in qualifying for his duties.

In a letter, No. 146, dated 29th November 1884, the Government of India sanctioned Mr. Blanford's proposal and intimated its belief that no difficulty would be found in securing a Native with the proper scientific ability and acquirements.

In pursuance of this sanction, Mr. Blanford engaged the services of a Native who had taken the degree of M. A. in the Lahore University. In reply to an enquiry by the Government as to the success of the experiment, Mr. Blanford, on the 14th January 1887, observed that he had had no reason to complain of the officer on the score of intelligence, but that that gentleman had never taken any interest in his work, and had scarcely done anything beyond the daily reports, which should not have occupied half his time: that, in fact, he had no sooner secured his appointment than he began to bestir himself to look out for something that would pay him better * * *, and that at length he had succeeded in getting an offer of an appointment in the Punjab Educational Department, to which he would be transferred as soon as a qualified successor had been obtained.

Mr. Blanford, considering that the salary and prospects offered were insufficient to attract and retain the services of a graduate, then selected a Native who had not taken a degree to undergo a probation of six months, at the expiry of which period he will be required to pass an examination, and, if he satisfies the examiner, he will be confirmed in the appointment.

As regards pension and furlough, the officers of the Educational Department enjoy the ordinary advantages of the particular service to which they belong; and where the officers belong to no other service, if they are required to devote their whole time to the Department, it is presumed they would come under the general rules for the Uncovenanted Service.

No evidence relating to this Department was tendered to the Sub-Committee at its sittings at Calcutta, Allahabad, Lahore, Bombay, Poona and Madras.

SECTION III.

SITTINGS AT SIMLA.

WITNESS No. 1.—*14th June 1887.*

Examination of JOHN ELIOT, Esq., Officiating Meteorological Reporter to the Government of India.

The *President.*

I believe you were Second Wrangler and Senior Smith's Prizeman at Cambridge in 1869. When did you come out to India?—In the same year, mainly for the benefit of my health. I accepted an engagement for three years as Lecturer in Mathematics at the Rurki Engineering College, and, finding that the Indian climate suited me, I subsequently accepted an appointment in the Educational Department as Professor in the Muir College at Allahabad, North-Western Provinces. Afterwards I was transferred to the Presidency College, Calcutta, and my permanent appointment is still that of Professor of Physics in the Presidency College. I should mention that about 18 months after my arrival in this country I acted as Meteorological Reporter to the Government of the North-Western Provinces, and have ever since maintained a connection with the Department. The Meteorological Department consists of a staff of six gazetted officers. The Meteorological Reporter to the Government of India and the Assistant Meteorological Reporter to the Government of India are attached to head-quarters, the four other Reporters are stationed at Calcutta, Madras, Bombay, and Allahabad, respectively. The salaries of the gazetted officers are shown in the following table :—

	Rs.
Meteorological Reporter to the Government of India.	1,800 per mensem
Assistant Meteorological Reporter to the Government of India, who is also Meteorological Reporter for the Punjab Government ...	600 to 750 "
Meteorological Reporter, Calcutta ...	450 "
" " Madras ...	300 "
" " Bombay ...	600 to 750 "
" " Allahabad ...	250 "

To explain the seemingly undue disparity between the salaries of the Local Reporters, I should state that the officer at Bombay devotes his whole time to the Department, while those at Calcutta and Allahabad are officers in the Educational Department and are not expected to devote their full time to their work in the Department. The appointment at Madras, which is a full time appointment, is held by a lady. The pay

The *President*—continued.

of this office was fixed at Rs. 300 when the appointment was held by the Government Astronomer in connection with his proper duties. The appointments to Reporterships in the Department are made partly by the Imperial and partly by the Local Governments; this is owing to the circumstance that the Imperial Department was grafted on to the local. Those appointments which rest with the Government of India are made by it, and the appointments at Madras, Bombay and the Punjab by the Local Governments in consultation with the Meteorological Reporter to the Government of India. On the other hand, the appointments at Allahabad and Calcutta are purely local appointments, but in exceptional circumstances the Local Governments might consult the Meteorological Reporter to the Government of India.

The department has not been so thoroughly constituted that any rules have been as yet laid down regarding the appointing authority. Mr. Blanford, the present Head of the Department, was originally appointed by the Secretary of State to the Geological Survey, transferred to the Educational Department, and was finally brought in to form the Meteorological Department as an Imperial Department. As I have stated, I was originally appointed by the Secretary of State to a professorship in the Rurki Engineering College and afterwards transferred to the Educational Department, and after having worked in connection with the Meteorological Department for some years, I am now temporarily transferred to this Department. The Assistant Meteorological Reporter to the Government of India was also appointed by the Secretary of State. Subordinate to the Reporters are a staff of Observers, of whom only two, the Meteorological Observer at Alipur, and the Actinometric Observer at Mussoorie receive salaries exceeding Rs. 100. It is the duty of Observers, as their title imports, to register observations and transmit them with punctuality to the provincial Reporter and to head-quarters. Each provincial Reporter superintends and inspects the observatories within his province, and the observations are tabulated

India.

Meteorological Department.

Sec. III.

John Eliot, Esq.

The *President*—continued.

by him and then sent up to the Central Office; the Central Office checks these tabulated reports and publishes annual and other reports based on the reduced observations.

Whose duty is it to issue forecasts?—If you mean forecasts of storms, that duty devolves chiefly on the Reporters of Bombay and Bengal. The Bengal Reporter warns the whole of the coast within the Bay of Bengal, and the Bombay Reporter the whole of the Bombay coast. The Government Astronomer, Madras, issues forecasts of storms for Madras. The forecasts which are issued from the head office are of a different and more general character, as, for example, the forecast of the character of the south-west monsoon rainfall, usually issued in the beginning of June.

What results have been obtained by the Department?—Some knowledge has been gained of the atmospheric currents and the paths of storms in the of Bay Bengal and the Arabian Sea. Those cyclonic storms, for example, are very much better understood than they used to be, so that we are able to warn the coasts in a more effectual way than was the case ten years ago.

I suppose the periodical atmospheric currents are also determined with greater exactitude than they used to be?—To a certain extent. The distribution of rainfall during the monsoons has been carefully watched also, and is being better understood, and some of the causes of its variations have been ascertained. The larger features of the climate and weather are fairly well known and understood, but much remains yet to be done in working out smaller details. The Department has obtained from the logs of ships a large number of observations as to the aërial currents in the Arabian Sea and the Bay of Bengal which assist it in determining the general course of the monsoon. As the result of 50,000 observations there have been issued from the Department weather charts of the Bay of Bengal and the adjacent sea north of the Equator, the average directions of the winds in every month of the year, and also their normal atmospheric pressure; the Department has also issued charts of the same area showing the specific gravity and temperature of the currents at the sea's surface, and it is at present engaged in compiling similar charts for the seas on the west of India.

What do you consider the qualities essential for efficient service in this Department?—The Reporters should be good mathematicians and physicists and acquainted with the literature of the meteorology of all countries where the science is studied, or observations are accurately recorded. Judgment and experience also are requisite to avoid hasty conclusions, while at the same time quickness of inference is necessary, especially in forecasting atmospheric disturbances, those of a cyclonic character particularly. In the Observers honesty and accuracy of work are necessary, as well as acquaintance with the instruments in use which is acquired at the Head

The *President*—continued.

Observatories. At the present moment all the Reporters are Europeans non-domiciled.

Do you think that sufficient scientific education is at present attainable in India to qualify persons to hold appointments as Reporters?—I think not. There are difficulties in this country in the way of acquiring the knowledge of European languages which it is necessary that every Reporter should know, as much of the meteorological literature is written in foreign languages, French and German especially.

You want, in fact, a more liberal education than is generally attainable by students in Indian colleges?—Yes. It is quite possible of course that there may be very exceptional men among the Natives of this country, who would be qualified to fill posts in the gazetted ranks of this Department. For instance, Mr. Ashutosh Mukerjee, so far as his mathematical and scientific acquirements are concerned, would make a very promising officer in the Department, but I think it doubtful whether the emoluments attached to offices in the Department would satisfy his legitimate ambition.

I presume you do not advocate that there should be any positive restriction on the employment of Natives in the Department?—Certainly not; but at the present time I consider it more economical and safer to employ European agency.

For a scientific department such as this, would you advocate a system of competition or selection in making appointments?—I should prefer a system by which gentlemen were recommended to the Secretary of State by the Meteorological Office in England. I do not think that a better method of selection could be found. In a very small Department like this, and in fact in all scientific Departments in India, you cannot afford to have a large precentage of failures. Owing to the smallness of the staff, it is absolutely requisite that measures should be taken to secure the most competent and reliable men that can be obtained for the salaries offered. As regards the Observers, they are Hindus and Muhammadans, as well as Europeans, Eurasians, and Parsis, and the great majority of them are Natives of Asiatic descent. They are paid very small salaries because only a portion of their time is expended on the work of the Department. Some of them are clerks to civil surgeons, telegraph officers, clerks in jails, overseers in the Public Works Department, &c. The main requirement is that they should be careful, reliable, and able to speak and write English. Those Observers who are not acquainted with the working of the instruments are allowed to attend at the provincial headquarters and are taught their duties there. As regards pension and furlough in this department, the whole-time Reporters have the ordinary advantages of the particular service to which they belong, and the local Reporters, that is, those who are not whole-time Reporters, derive no advantages in pay and furlough from their connection with this Department.

WITNESS No. 2.—*14th June 1887.*

Examination of WHISCOMBE DALLAS, Esq., Assistant Meteorological Reporter to the Government of India and Meteorological Reporter to the Government of the Punjab.

The *President.*

Where were you educated?—At the Morningside Academy and at a private school, Edinburgh. During the latter part of my residence in Edinburgh I attended lectures on physics and chemistry, and subsequently, when I went abroad to Switzerland and Germany, in addition to studying French and German, I continued my education in physical science. On my return from the Continent I went to London and was appointed to the Meteorological Department of the Board of Trade in 1872. In 1882 I was recommended by the Meteorological Council in England to the Secretary of State for the appointment of Assistant Meteorological Reporter to the Government of India, and joined that appointment in September 1882.

What is your opinion of the constitution of the Department?—I agree generally with the views expressed by Mr. Eliot as to the constitution of the Department and the qualifications necessary for service in it. I only regret that I had not the opportunity of attending the Cambridge University and perfecting my knowledge of mathematics, as

The *President*—continued.

I am more and more impressed with the necessity of it. As to the mode of selecting officers for this Department, I agree with Mr. Eliot that these appointments should be made by selection, and I think that the recommendation of the Meteorological Council would secure probably the most efficient officers. If not indispensable, it is at least most desirable that any officer employed in the upper grades of this Department should have had the benefit of a European or American training, and I consider also that it is necessary to the maintenance of the efficiency in the Department that he should visit Europe periodically and make himself acquainted with the theories discussed, though possibly not yet published, among the scientific men of the day.

Considering the means at the disposal of the Department, what do you think of the work turned out by it?—So far as I am able to judge, I should say we do very much better work than they do in the Meteorological Department of the Board of Trade. Ours is a higher class of work and better done. We aim higher.

G. C Press, Simla.—No. 2 F. S. C.—6-8-87—600.

SCIENTIFIC DEPARTMENTS.

PART II.

GEOLOGICAL SURVEY.

PROCEEDINGS

OF

THE SUB-COMMITTEE,

PUBLIC SERVICE COMMISSION.

INDIA.

Geological Survey.

Section I.—Note by the Sub-Committee.

The sanctioned staff of the Geological Survey embraces seventeen gazetted appointments, *viz.*, the Director on a salary of ₹1,500, three Superintendents on salaries of ₹800 rising to ₹1,100, one Senior Deputy Superintendent on a salary of ₹700 rising to ₹1,000, five Deputy Superintendents on ₹500 rising to ₹700, six Assistant Superintendents on ₹350 rising to ₹500, and one Palæontologist on ₹500 rising to ₹1,000.

There are at present four vacancies in the grade of Assistant Superintendents, of which one is kept open to provide the pay of two Native Superintendents, and another to pay the cost of Palæontological work. The appointment of Palæontologist has only been filled up in the present year.

There are five subordinate non-gazetted appointments, *viz.*, an Artist on a salary of ₹250—₹400, a Registrar, who is the Secretary and Librarian of the Department, on a salary of ₹240—400, two Sub-Assistant Surveyors on salaries of ₹150—₹200, and one Museum Assistant on ₹100—250. A gentleman who was obliged to resign his appointment in the Department owing to ill-health, and who on his return to Europe received the appointment of Professor of Palæontology in the University of Prague, is at present specially employed to report on the fossils in the Salt Range which were discovered by him when he was in the service.

Of the higher appointments, thirteen are held by Europeans not domiciled in India; one appointment in the 2nd grade of Deputy Superintendents is held by a Hindu; two of the vacant appointments in the Assistant Superintendent grade have, it is understood, been promised to Hindu gentlemen of whom one has for several years studied in Europe, and the other has recently gone to England for further scientific education. The appointment of Artist was held by a European, but is now vacant; that of Registrar is held by a European, and that of Museum Assistant by a Eurasian; while the two Sub-Assistant Surveyors are Sikhs, Natives of the Punjab, who have been appointed to the Department as an experiment.

Ordinarily the appointments to the gazetted staff are made by the Secretary of State, who, on the occasion of a vacancy, receives information from the Director as to the particular branch of collateral science, whether Palæontology, Chemistry, or Mineralogy, the candidate should be well versed in according to the requirements of the Department at the time. The Secretary of State invites candidates from the Universities and the Royal School of Mines. From gentlemen who offer themselves or are recommended a selection of the fittest is made after their qualifications and suitability for employment in India have been ascertained by two referees, of whom one is the Director of the South Kensington Museum, and the other is selected by the Government of India. Mr. Blanford, formerly a member of the Department, is at present the referee so selected.

It was originally understood that candidates selected in England would be required to undergo a probation of five years before they were permanently appointed to the Department; but this condition was never actually enforced. The present rule requires a probation of two years; and although an occasion has not yet presented itself for its application, the present Director intimates his intention of enforcing it.

Promotion normally takes place by seniority. In view, however, of the necessity that the upper grade should always be filled by men of proved ability, it is occasionally governed by merit; but in this case the special sanction of the Government of India is obtained.

The gentleman who at present fills the post of Palæontologist was specially selected by the Secretary of State from scientists who had an established reputation in that branch of research. It therefore happened that he was over 25 years of age at the date of his appointment.

India.

Geological Survey.

Section I.

The scale of salaries for the graded officers was fixed by Resolution No. 226, dated 21st April 1875. The Director considers it very inadequate as compared with that given in other Departments, in which the educational qualifications are not greater, and in several cases very inferior, to those required for the Geological Department.

The Director is of opinion that it would be well to introduce the same system of selection from men of established reputation for the recruitment of the Geological staff as was recently adopted in the appointment of the Palæontologist, inasmuch as the highest academical success is not a guarantee of capability in independent scientific work. But he observes that, if this plan were adopted, the lower limit of pay would have to be changed, as has been done in the case of the Palæontologist; and this he regards as a real economy, because the nature of the work is such that an inefficient officer is altogether useless, there being no routine work in which he could be employed.

The pension and furlough rules prescribed by the Codes for the Uncovenanted Service apply to officers in this Department. The Director considers the furlough rules liberal enough, but objects that the pension rules which were framed for the great body of subordinate officers almost exclusively recruited in the country are wholly unsuited for a very scientific service that can only be recruited by very careful selection from young men of high education in Europe; and he repeats the representation, which has frequently been made to Government, that the Geological Department ought to enjoy at least as favourable pension rules as are conceded to officers in the Public Works Department recruited in Europe.

As to the technical requirements for officers in the higher grades of the Department, the Director observes that Geology is singularly free from requirements that can properly be called technical. "The Geologist," he says, "always works with ready-made maps, and the only operation he has to perform is to take the dip of a stratum or vein with a clinometer and a pocket compass. To sketch well is a very useful accomplishment for a Geologist, but by no means essential." While he points out that Geology is a most useful and even essential guide in many engineering projects, he indicates that the principal qualifications of a Geologist are scientific rather than technical. It is the aim of Geology "to understand all about the substances forming the crust of the earth; and as these are the very example result of the slow operations of nature throughout past time, the understanding can only come through a knowledge of these operations, *i.e.*, of the combined action of all the various modes of motion or force concerned in the formation of the earth. The basis of this knowledge is the Physical Sciences (Mechanics, Heat, Chemistry), and, as concerning fossils, the Biological Sciences. This, of course, implies that Geology has several special lines of research for which a mastery of one or more particular science is needed; but for the intelligent performance of any Geological professional work, a sound knowledge of Physical Science is essential; and the work is worthless or good in proportion to that knowledge. It should be apparent, too, that having to deal with such complex and often obscure facts, the Geologist stands much in need of the broad judgment and sense of proportion that is the best result of education." He adds that unless the Geological Survey of India can turn out work up to the mark of the science of the day, it would be better to abolish it.

The Officiating Director states that the Department is one in which the work, if it is not accurate, is absolutely worthless. Geology, he observes, is not an exact science; and it requires therefore a more careful and accurate recognition of the materials of which the earth is composed, and also considerable care in generalization on the facts that are presented.

The Director reports that he receives applications for employment in the Department from all classes; and to correct "the very vague popular notion of Geological work," he has forwarded to the Sub-Committee a copy of a letter addressed by him to the Government of India, dated 17th July 1886, relating to the employment of Natives in the Department, together with a note on the same subject which the Commission will no doubt desire to peruse in their entirety. He appears to consider that while Natives possess decided ability in Civil and Judicial administration, they show themselves wanting in the prosecution of those sciences in which conscious and inductive reasoning are the only clues to positive knowledge; and he says that the explanation is not far to seek: "the constitution of mind, the keynote of rising thought and civilization which it has taken many generations to bring forth in the West, cannot be suddenly transplanted into men who have till now been nurtured exclusively in the crudest superstitions. That the mind is a *tabula rasa*, ready to receive whatever knowledge may be presented to it, is a psychological fallacy long since abandoned * * * Verbal or notional acquisition may be exercised upon the various forms of science as well as in any other barren learning; and the marvellous facility shown by Native students in such acquisition without a grain of understanding is only a reflected proof of the inanity of the learning which could produce such confirmed sterility of intelligence." In support of his opinion that Natives have no natural capacity for highly scientific work, he appeals to the fact that Natives have had special training in several branches of science (Botany, Chemistry, Physics, Mechanics), and also more or less of practical opportunity of bringing this knowledge to bear fruit in the Medical and Engineering Services—the same sort of teaching and opportunity as have elsewhere given rise to many leading men of science—yet the result in what could be called scientific work has been absolutely *nil*.

Dr. King, the Officiating Director, in the main, endorses Mr. Medlicott's views as to the fitness of Natives for employment in the upper grades of the Department; but he is of that their employment in the lower branches is open to a freer consideration.

The duties of the subordinate officers are thus explained by him. The Artist is employed to make drawings of fossils and to prepare plates for publication. The two Sub-Assistant Surveyors are employed in the field to map out detailed work that is shown them; and one of these officers has, Dr. King testifies, a very good practical acquaintance with the coal rocks of a particular system. The duties of the Registrar and Librarian and of the Museum Assistant are indicated by the titles of their appointments.

Dr. King is of opinion that at present the educational opportunities of India are not sufficient to instruct men to the degree and with the accuracy which is requisite for efficient service in the Department. As an Examiner for the Universities of Calcutta and Madras, Dr. King is of opinion that hitherto there has been practically no instruction at all given in Geology. It is, however, only fair to observe that of recent years very much greater attention has been paid to the cultivation of Physical Science in Indian Colleges than was formerly the case, that experienced teachers have been obtained from England, and that until time has been afforded to test the results of this teaching, it would be premature to arrive at the conclusion that Natives may not be forthcoming who would be capable of original scientific research.

While intimating his preference for the recruitment of Europeans from scientists of established reputation, Mr. Medlicott states that University men who have received some education as distinguished from training have shown a very decided superiority over those from the highest special schools.

Dr. King is also of opinion that University men who have received special training in a branch of Geology are superior to those selected from the School of Mines, inasmuch as they are more likely to hold broad and liberal views on the subjects they have to deal with than the men who have received their education in a special school.

The following extracts from the official correspondence which has been laid before the Commission will suffice to show that the Government of India has strenously endeavoured to promote the employment of Natives of India in the Department; and that its efforts have been encouraged and approved by successive Secretaries of State. Lord Mayo being anxious to promote the employment of Natives in the Geological Survey of India, invited Dr. Oldham, the Superintendent of the Geological Survey, to consider a scheme for providing the necessary scientific instruction.

In a letter No. 376, dated 8th June 1869, Dr. Oldham accordingly submitted proposals to the Government of India for the establishment of special courses of lectures. His idea was to communicate some knowledge of the collateral and necessarily preliminary studies of Chemistry, of Natural History, and of Mineralogy; and by teaching these with a special view to Geology "to form a body of men, Natives, or Europeans, or Eurasians * * * out of whom some could be selected whose progress and acquirements justified the hope that they would prove useful, and finally become trustworthy Assistants in the Survey; while many others would be qualified to undertake independently duties of mining, mining-engineering, metallurgy, &c."

The Government of India in Financial Resolution No. 2139, dated 31st March 1870, expressed itself constrained by financial considerations to refuse sanction to Dr. Oldham's proposals; but the object contemplated was not lost sight of, and in September 1872 Mr. A. O. Hume, Secretary to the Government of India, under the direction of the Member in charge of the Agricultural and Revenue Department, drew up a Memorandum, No. 544, dated 5th September 1872, containing modified proposals for the establishment of a Geological class, which were approved by the Governor-General in Council in Financial Resolution No. 3121, dated 30th September 1872, and communicated to Dr. Oldham in a letter No. 670, dated 18th October 1872. The scheme sanctioned was the following:—

Dr. Oldham was authorized to select from amongst the most distinguished of the scholars of any of the Indian Colleges for training as Geologists three or four youths, preferentially up-country men, who possessed a good knowledge of English, general intelligence, and a capacity for physical exertion, and were able and willing to endure exposure.

These young men were to be engaged as apprentices, and for the space of a year to undergo instruction at the Geological Survey Museum, so as to recognize and distinguish the more common minerals, be taught the leading principles of the science and familiarised with the more typical fossil forms that characterize the deposits of various ages in India. At the end of the year's instruction, they were (if approved) to be attached for six or seven months in the working season to one of the most competent Geologists in the field; and at the close of the season to be sent back to the Museum to receive further theoretical instruction. They were then to undergo an examination to test their qualifications and the probability of their becoming thereafter useful subordinate members of the Geological Survey Department. On passing this test successfully, they were again to be sent to the field, and at the close of the field season to return to the Museum to continue their studies, and if possible, attend a course of lectures on Chemistry at a Medical College. For a further period of two years their qualifications were to be periodically tested; and, after an apprenticeship of not less than five years, they were to become entitled, if pronounced qualified, to permanent appointments as Sub-Assistant Geological Surveyors, and were to be employed under the supervision of one of the senior European officers, and in the same geological tract.

Each probationer was to receive a monthly stipend of ₹30 in the 1st year, ₹50 in the 2nd year, ₹75 in the 3rd year, and ₹100 in the 4th and subsequent years (each increase being dependent on certified satisfactory progress) until declared competent to act as a Sub-Assistant, when he was to receive ₹150 rising by yearly increments to ₹200 a month. If thereafter any exceptionally able Sub-Assistant should be declared fully qualified for independent work, he was to be allowed a further increment of ₹20 per annum, by which he might rise in ten years on further approved service to ₹400. It was believed that with these prospects really good Native Assistants might be obtained, some of whom would thereafter prove valuable members of the Survey; while others, who gave no promise of attaining a high standard, might yet in some cases be usefully retained as Assistants in the field on ₹30, ₹50, ₹75, or ₹100, according to their capacity.

To meet the expense entailed by these arrangements, it was decided that, on the occasion of the next vacancy that might occur among the European Assistants, the appointment should not be filled up; and that any future increase of expenditure arising from the same cause should be similarly provided for.

In communicating to the Secretary of State the plan it had formed, the Government of India (Despatch No. 30, dated 31st October 1872) observed that the principle of the scheme was the gradual supersession to a certain extent of European by Native agency; that the staff of the Department was numerically so weak that the completion of the vast area of work still before it could not be expected for many years; that the English Assistants were for the most part competent to be the heads of local Geological Surveys; and that it was to this position, while reducing their number and employing the money thus set free in the remuneration of a much more numerous class of Native observers, that the Government of India would gradually seek to bring them. The Duke of Argyll expressed his approval of these measures.

In pursuance of the orders conveyed to him, Dr. Oldham addressed the Directors of Public Instruction in the North-West Provinces and the Punjab, inviting them to assist him to procure suitable candidates for the proposed appointments.

The Director of Public Instruction, North-West Provinces, considered that the terms offered were inadequate to attract well-qualified students.

The Director of Public Instruction in the Punjab recommended two students for admission as apprentices: one of them, a Rajput of the Punjab, aged 21; the other, a Native of Nepal, aged 18. Both of these youths had passed the Entrance examination of the Calcutta University in November 1871, and were prosecuting their studies in Punjab Colleges.

In a letter, No. 439, dated 8th January 1873, Dr. Oldham informed the Government of India of the result of his application to the Directors of Public Instruction. He mentioned also that he had received applications from individuals, chiefly Bengalis; but that the applicants were draftsmen or schoolmasters who had had no sufficient preliminary training in scientific studies. He intimated his intention, if the Government approved, to accept the candidates recommended by the Director of Public Instruction in the Punjab; and he thought it advisable to go no further until actual trial had shown the feasibility of the proposed plan. He mentioned as his reason that the scheme of instruction he was directed to pursue appeared to him far more likely to prove an utter failure than to achieve success. He considered it an inversion of the system which must be adopted to make useful Geologists. "No man," he observed, "can be taught to distinguish the common minerals, even the commonest, who has not first acquired a certain amount of acquaintance with the principles of Chemistry. No one can learn to distinguish even the common fossils without a certain amount of acquaintance with the principles of Natural History." He went on to say that such a general and elementary acquaintance the apprentices would have no opportunity or means of acquiring in the Museum, though he admitted that a certain amount of eye-knowledge of forms and structures could be acquired there, and that it was to a large extent useful. But he declared that such a smattering of the principles of Geology and such a superficial acquaintance with the forms of life fossilized in various rocks had led to nine-tenths of the errors and mistakes which Geologists were every day meeting in their progress. He asserted that for many years past, on every fitting occasion, he had been steadily and earnestly urging the necessity of providing for the people of India the means of acquiring a knowledge of the Physical Sciences. "I have," he continued, "the most unshaken confidence that, with even fair opportunities of acquiring such knowledge, many would be found quite competent to take their place side by side with European Assistants either on this Survey or in many other ways. And I trust I shall be believed when I state that it is certainly from no feeling of the unfitness of Natives efficiently taught for such pursuits, nor from any idea of their incapacity, moral or intellectual, that I am unable to see any prospect of success in the present scheme. It appears to me—to use a very common, but perhaps expressive, phrase—to be putting the cart before the horse * * * At the same time, so far as the means at my disposal are available, I shall not fail to make the effort loyally and faithfully to produce results something approaching to those which appear to be anticipated."

Dr. Oldham was directed (letter No. 39, dated the 16th January 1873) to accept the services of the two candidates recommended by the Director of Public Instruction, Punjab, and to spare no efforts to procure other eligible candidates.

Dr. Oldham was succeeded as Superintendent by Mr. Medlicott, who entertained a less favourable opinion than Dr. Oldham of the capacity of Natives for original research, and even

stronger objections to the practical value of the course of instruction proposed for Native apprentices.

In a letter addressed to the Government on the 9th May 1873 (No. 539), he observed: "I do not at all wish to prejudge one side of the case by saying that Natives are unfit to receive scientific instruction. It is quite enough for the position to say that they have no special aptitude, no scientific intuitions to enable them to dispense with proper instruction. This fact is abundantly proved by the absence of a single instance among them of the self-evolved scientific labourer, a class of which there is such a fruitful crop in Western societies, although the seeds of scientific ideas have been to some small extent scattered amongst them for the last half century. We are, however, bound to take for granted that the acuteness displayed by the Native mind in certain pursuits admits of being turned in the direction of Applied Science. But that is not the question to be settled. It is: Can a useful Geological Surveyor, European or Native, be made otherwise than by scientific instruction? We have been ordered to impart such an eye-knowledge of rocks, minerals, and fossils as would enable an ignorant man to execute Geological Survey works."

He conceived that a misapprehension had arisen from the use of the term *survey* in connection with Geology, "implying by supposed analogy some manual operations to be conducted." He admitted that topographical surveying was "so largely a mechanical operation that the details of it might safely be executed by men who could not understand a proposition of Euclid." He also observed that "some sciences admit of and require a large amount of work to be done in the collecting, arranging, and describing of objects with little or no reference to the physiological and biological laws which give the ultimate scientific interest to such labours." If it was meant that the Native apprentice should be only a sort of automaton like the practical topographical workman, Mr. Medlicott considered the complete answer was that there was no room for such a workman in Geology. "Geology," he said, "though based upon the visible, has essentially and peculiarly to deal with the unseen; to interpret certain actual relations through known laws of change into a conception of by-gone conditions. However great the labour and exposure involved in hunting up the out-crops of rocks in the beds of streams and elsewhere, the Geologist has really nothing to make or to do in the sense of manual execution. He has to examine and make note of the facies of the rocks with reference not merely to the texture, structure, composition, and fossil contents of the masses, but with a clear apprehension of, and constant reference to, the conditions of formation implied by these complex visible characters; to compare, balance, and affiliate, with constant reference to those conditions of formation, the observations made at one spot with those made elsewhere with a view to natural grouping. Such is really the every-day duty of the Geological Surveyor. The collecting, ticketing, and mapping of different varieties of rock is quite a collateral business, though to many it comprises their only idea of Geological surveying. Under the most careful arrangements for the selection of Geological Assistants, when the organization of the Survey does not admit of securing at once men whose ability has been proved by independent work, one cannot escape enlisting some men of very limited aptitude for scientific pursuits, whose work can have only a minimum of scientific and hence of practical value. * * * A poor topographical map is still an approximation to correctness; whereas a geological map, unless made and described with intelligent attention to principles which cannot by any means be cast into practical rules, is simply a delusion not worth the paper it is printed on, much less worth the pay of the man who made it. No amount of checking can trim such work into a presentable form. If the man who colours a map geologically cannot give a rational account of his observations, no one can do it for him from the map; the ground must be resurveyed by a competent observer."

He proceeded to observe that the most elementary principles of Geology presupposed a rational apprehension of natural phenomena; and that sound instruction in Geology could be imparted only to a student who had already some knowledge of Chemistry and Physics. He pointed out that to work the apprentice system, even if the men came prepared to learn Geology and Mineralogy, would require the time and attention of two or more of his best Assistants "to act as private tutors to as many Native youths." But he went on to say that the apprentice system as it stood did not provide pupils so prepared, and that he had neither means nor men to instruct them in the essential preliminary knowledge of Chemistry and Physics. He therefore proposed that intelligent students of promising physique selected from the up-country Colleges should, instead of being thrown at once upon the hands of the Survey, be obliged to attend for at least a year uninterruptedly all the Science classes at the Presidency College; their further instruction in Geology depending on their success in the preliminary studies.

The Government of India, in its letter No. 342, dated 19th May 1873, replied that it had been understood that the very elementary training in Geology which the apprentices were at first to receive would be undertaken by the Curator of the Museum; and that it looked to the Superintendent to see that the apprentices did *bonâ fide* receive such instruction from the Curator. The Governor General in Council, admitting that in the case of every new undertaking serious difficulties must be expected at the outset, expressed his confidence that the Superintendent and other members of the Geological Survey would loyally devote their best energies to overcoming these difficulties, and would fully recognize the importance attached to the success of the project. His Excellency in Council consented that the one apprentice then in the Museum should attend the Physical Science classes at the

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Presidency College under the direct supervision of the Superintendent, who was further enjoined to endeavour at once to increase the number of apprentices to four, so as to enhance the chances of at least one of them proving thereafter qualified to enter the subordinate grade of the Survey.

The result of these orders is stated in a Despatch from the Secretary of State, No. 34 (Geographical), dated the 10th July 1879. Of four apprentices originally engaged, two appear to have given satisfaction. They had earned a character for steadiness, and made fair progress in the less advanced stages of Geology. The Government of India consequently proposed to appoint them to the rank of Sub-Assistants; but their further advancement was made contingent on their mastering a knowledge of Geology proper, in which the Superintendent had reported that they were very backward. In sanctioning these arrangements, the Secretary of State observed: "It is unnecessary for me to repeat on the present occasion any expression of opinion as to the high importance which Her Majesty's Government attach to the employment, so far as is consistent with reasons of State policy, of duly qualified Natives of India in the various grades and branches of your Government; and I may remark that I note with pleasure from General Walker's last report that the Natives employed in the subordinate posts of the Topographical and other branches of the Survey Department have in numerous cases given great satisfaction in the discharge of their duties. I am unable to say how far it may be possible to supply future vacancies in the Geological Survey from the ranks of educated Natives of the country. But when the financial state of affairs shall admit of it, it may possibly be found feasible to establish lectures and a system of examinations at some of the Indian Universities which would have the effect of eliciting and encouraging any marked aptitude for Geological investigation."

In Resolution No. 70 (Surveys), dated 13th February 1880, the Government of India called on the Superintendent to submit a report on the work of the Native Assistants; and that gentleman consulted the European Assistants with whom the Native Superintendents had worked. Mr. Theobald reported of one of them who had worked with him in 1878-79 in an exploration for fossils that he seemed to take an intelligent interest in the work, and was therefore fitted to undertake separate work on his own account. Mr. Griesbach, under whom the same officer had worked subsequently, and who had also had experience of the work of the other Sub-Assistant, while testifying that both were willing at all times to be useful, of the strictest integrity, and of gentlemanly behaviour, expressed his conviction that neither would ever be able to carry out independent surveys. He stated that he had found them deficient, not so much on account of inherent incapacity, as because the foundation of their training was of too limited a description; that both were entirely deficient in Geodesy and simple drawing, and that their knowledge of Physics and Physical Geography, with all branches of Natural History, was of too fragmentary a nature to enable them to carry out independent work in the field. In forwarding these reports to the Government of India, together with the answers given in a test examination to which he had subjected the Sub-Assistants, Mr. Medlicott repeated his conviction that only men of the soundest training in inductive science were fit for the work required; and he mentioned that Native Engineer students of the Thomason College entered the Public Works Department on greatly higher pay and prospects than were offered to Native Assistants in the Geological Survey, although the knowledge required for the Survey work was of a much higher order (letters Nos. 73 and 81, dated 10th and 15th March 1880).

The Government of India, in its letter No. 135, dated 25th March 1880, admitting that, owing to the want of such general and special education as would serve as a foundation for their training in Geological work, it appeared doubtful whether the Native Assistants then in the Department would ever be qualified for independent research, observed in reference to the general question as to the employment of Natives in the Department: "It is true that Geological work requires a special aptitude, which at present, perhaps, does not exist, or is not readily discoverable among the Natives of India. But this is a defect which time and education must be trusted to remedy; and meanwhile the Government of India see no reason to abandon the experiment. If the present probationers fall short of the required standard, there are grounds for believing that better results might be obtained by selecting a different stamp of men." It accordingly directed that one of the two appointments then vacant in the Assistant's grade should be utilized for the purpose. It left the selection to the Superintendent, but suggested that he should consult the authorities of the Rurki College where the best class of Natives were trained for engineering. It postponed the consideration of the question of pay and allowances until the selection was reported.

Mr. Medlicott, in his letter No. 117, dated 12th April 1880, argued that the instruction at Rurki embraced only some of the sciences auxiliary to Geology. But he mentioned that an excellent paper relating to the Geology of India, written by Mr. P. N. Bose, a Bengali gentleman, had appeared in the *Journal of the Geographical Society of London*; that he had ascertained that Mr. Bose had obtained the Gilchrist scholarship at the Presidency College, and had since pursued his studies in England; that he was, or had been, a pupil at the School of Mines that he had obtained the degree of B. Sc. at the University of London, and had been elected a Fellow of the Geographical Society. He added that he considered that Mr. P. N. Bose had a high claim to an appointment in the Geological Survey of India, and would gladly welcome him as a colleague. In consequence of this recommendation, Mr. P. N. Bose was offered and accepted an appointment as Assistant Superintendent.

The Government of India did not leave the suggestion of the Secretary of State respecting the establishment of lectures and examinations at Indian Universities unnoticed. It caused the Despatch of the Secretary of State to be circulated to the Local Governments and the Calcutta University for consideration with reference to the Secretary of State's suggestion. The replies received are summarized in Resolution No. 4—129-35, dated 10th September 1880.

The Registrar of the Calcutta University pointed out that the Act of Incorporation of the University did not provide for the establishment of lecturerships, but that Geology was one of the optional scientific subjects in the examination for the B.A. and M.A. degrees.

The Government of the North-Western Provinces and Oudh did not consider that any action was called for at that time in those Provinces, but intimated that the Rurki College seemed to be the proper place for teaching the subject; and that, were a class formed, a Professor of Physical Science at the Muir Central College was competent to act as an instructor, though his time was already very fully occupied.

The Government of Bombay mentioned the recent creation of a Professorship of General Biology in the Elphinstone College, Bombay, and stated that arrangements would be made in connection with it for a course of lectures on, and a system of examination in, Geology.

The Government of the Punjab stated that provision existed for the study of Physics and Chemistry at the University College, and that in the opinion of the Lieutenant-Governor, there would be no advantage in establishing lectures on Geology until a general knowledge of the elements of Physical Science had been acquired.

The Government of Madras mentioned that Geology had always been one of the optional subjects for the M.A. course, but that up to that time no candidates had selected it; that a Professor of Physical Science was appointed in the Madras Presidency College in 1875; that a new course for the B.A. degree had been recently introduced which included Geology, Mineralogy, and Palæontology, and that should students apply for instruction in the branch of science in question, the sanction of the Government of India would be sought for an additional chair of Professor of Geology at the Presidency College, the time of the Professor of Natural Science being already fully occupied.

The Government of India, referring to the arguments used by the Superintendent of the Geological Survey that to be an efficient Geologist a man must already possess general scientific training; that in Geology there was no room for the merely mechanical application of a superficial knowledge of rocks, minerals, and fossils; and that no valuable results could be obtained in that science, except by persons acquainted with scientific methods, expressed itself disposed to accept this view; and that effort should be directed towards the promotion of the study of Natural Science generally. It considered that the great object should be to encourage among the better educated class of the Native community a scientific habit of mind; and it observed that the probability of finding Indian students who were capable of real success in Geology would increase in proportion as scientific modes of thought became less rare. Inasmuch as the Local Governments had not had an opportunity of considering the subject from this point of view, the Governor General in Council invited from the Local Governments of Madras, Bengal, and the North-Western Provinces and Oudh any further remarks they might desire to offer on the best means of providing for Geological training as part of a scheme of education in Natural Science generally, and declared the readiness of the Government of India to receive favourably well-considered proposals for that end.

This Resolution led to a correspondence which has not been laid before the Sub-Committee, but of which the effect may be inferred from letter No. 368S., dated the 5th September 1882, from the Secretary to the Government of India to the Superintendent of the Geological Survey.

On the question relating to the encouragement of the study of Geology in schools and colleges, it appeared to the Governor General in Council that, while special instruction in Geology was not, as a rule, provided at the Indian Colleges, a fairly good education in the less specialized Natural Sciences was everywhere obtainable; and that this was the best and, as matters stood in India, the only possible preparation for Geological study. His Excellency in Council agreed with the Superintendent that, so far as the Geological Survey Department was concerned, special provision for Geological training in Indian Colleges was not required, and that it would, so far as it might be calculated to raise hopes that could not be fulfilled, be injurious, inasmuch as the Department mustered only fifteen graded officers—a number too small to offer any inducement to the opening of special classes, even if such classes could be counted on to turn out qualified candidates. It was, at the same time, observed that Native students who had taken high degrees at Indian Colleges in the Physical Sciences would always offer a field of selection; and that their previous training would render them more likely to acquire the habit of mind requisite for the work of the Geological Survey than the training which a student of the single specialized subject could be expected to obtain in the curriculum of an Indian College. As regards the question of appointing Native probationers in future to the Survey, the Government of India considered that the objections taken to it by the Superintendent had much force. It admitted that not only was the work of a special nature requiring, if it was to be of any use, to be kept up to a very high standard of scientific completeness, but that the smallness of the Department required peculiar efficiency in each of its members. Nor, it was added, was it rendered attractive by the existence of any great prizes, the pay of the European officers in the Survey being not much more than that to which a Deputy Collector

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might hope to attain, while the service was onerous and exhausting. It was observed that in practice it was difficult to maintain a supply of duly qualified European candidates.

In view of these considerations, His Excellency in Council came to the conclusion that the restriction of any fixed proportion of the appointments to Natives, while it might materially weaken the efficiency of the Department and go but a small way towards encouraging the study of Physical Science on the part of Native candidates for employment, would have quite an insignificant effect in reducing expenditure. But, while allowing the imperfections of the scheme originally adopted for introducing Natives into the service, His Excellency in Council continued to insist on the nomination of Natives, provided that the nominations were confined to graduates in the Physical Science schools of Indian or other Universities. Referring to the appointment of Mr. P. N. Bose, a graduate of the London University, it was observed that from time to time similarly qualified Natives might offer themselves for employment in the graded ranks of the Department, and that the Government of India would look to the Department to keep this object in view as vacancies occurred.

In pursuance of the policy indicated, the Government of India, in Despatch No. 12, dated 15th December 1885, at the instance of the Government of the North-Western Provinces, recommended that an appointment in the Geological Survey should be bestowed on Man Mohan Lal, a student of the Muir Central College and Gilchrist scholar, who had recently gone to Europe to complete his studies; and in a Despatch No. 21, dated 23rd November 1886, expressed its willingness to accept the appointment of Mr. Parvati Nath Dutta to a graded appointment. This gentleman, who had studied for some years in England, had received the highest testimonials from Professor James Geikie, of Edinburgh, who had testified that very few of the students of British nationality had equalled him in special aptitude for Geological study and research.

Mr. Medlicott opposed the appointment of Mr. Man Mohan Lal on the ground that both reasoning and experience were opposed to the appointment of Natives of India to the Geological Survey; and Mr. W. T. Blanford, formerly a member of the Department, in a letter addressed to the Under-Secretary of State for India, dated 31st August 1886, supported Mr. Medlicott's opinion. Mr. Medlicott was also opposed to the appointment of Mr. Parvati Nath Dutta.

The Government of India, in its Despatch of the 23rd November 1886, already quoted, stated its opinion that Mr. Medlicott's arguments were founded upon a too slender basis of experience to be accepted. It was pointed out that the only Natives of India who had yet been tried in the Survey were two young Punjabis educated entirely in India with but a defective knowledge of English, who had, previously to their appointment as apprentices, received no Geological or other scientific training whatever, and one Bengali gentleman.

The Governor General in Council was not surprised that the first two of these had not shown themselves adapted to the higher work of the Department, and when Mr. Medlicott endeavoured to support the thesis that the deficiencies of the third gentleman were universally incident to his race, and that the experience of which he was the sole example was sufficient to condemn the experiment of appointing Natives of India, however well vouched for, to the Department, His Excellency in Council was unable to accept the facts as sufficient to warrant the inference. He could not concur with Mr. Medlicott that a single failure was sufficient to prove that scientific accuracy and originality could not possibly be found among Natives of India, and he intimated his desire that the experiment of employing Natives of India in the Department should not be finally abandoned. It was also pointed out that if Mr. Medlicott's anticipations were realized, the interests of the Department could be protected by the retirement of the Native officer at the end of his period of probation.

Dr. King was the only witness produced for examination at Simla, and the substance of his opinions has been already given. No witnesses were produced or appeared at any of the other places at which sittings were held. Mr. P. N. Bose, Deputy Superintendent, the circumstances of whose appointment to the Department have been mentioned, has favoured the Sub-Committee with a brief note. Mr. Bose is of opinion that so long as no adequate provision for the teaching of Geology and the allied sciences is made at Indian Colleges, appointments to the higher grades of the Department should be made by the Secretary of State in England, irrespective of the nationality of the candidates, and he suggests that the scientific members of a Committee, of which in his note on the Educational Department he has advocated the appointment, should act as referees for appointments to the Geological Department also.

He adds that although Indian Colleges are unable to train men for higher work, they are able to prepare students for such work as tracing out detailed boundaries, fossil-collecting, &c. He therefore proposes that the number of appointments in the Sub-Assistant grade should be increased to ten or twelve, and be filled either by competitive examination or by selection from among the graduates in Science of the Indian Universities, who have taken up Geology for their degree; and that the Sub-Assistant, if found qualified, should be promoted to the higher grades of the service.

Section II.—Note by the Departmental Member.

The information is given under the headings specified in Mr. Daukes' letter No. 200, dated 18th March 1887 :

I.—Appointments are only made at the bottom of the list of Assistant Superintendents. They are always made by the Secretary of State. When a vacancy occurs, the Director submits to the Government of India a requisition specifying what particular branch of collateral science (whether Palæontology, Chemistry, or Mineralogy) the candidate should be strong in, according to the requirements of the Department at the time. This is forwarded to the India Office, and the Secretary of State issues a call to the Universities and to the Royal School of Mines for eligible candidates. From those who may offer the Secretary of State selects the fittest, with the help of a reliable referee recommended by the Government of India. This last condition is an important one, some very bad selections having been made by referees appointed merely *ex-officio*.

Promotion takes place normally by seniority, but it is occasionally necessary in the interest of the Service to pass over the less efficient members, for the upper grade should always be held by men of proved ability. This is only done upon due representation with the sanction of the Government of India.

The Palæontologist is especially selected by the Secretary of State from rising men who have already established a reputation in that branch of research. On this account it generally happens that the nominee is over 25 years of age. It would, I think, be well to introduce the same practice for the Geological staff, for the highest academical success is not a guarantee of capability for independent scientific work. Were this plan adopted, the lower limit of pay would have to be changed, as has been done for the post of Palæontologist; but it would be real economy, because the nature of the work is such that a "bad bargain" is downright useless; there is no routine work he can be put to. University men have shown a very decided superiority over those from the highest special schools. I mean B. A. Graduates who have received some education as distinguished from training.

II.—The scale of pay is given under section V. It was fixed in 1875 (Revenue, Agriculture, and Commerce Department No. 266, dated 21st April 1875). It is certainly very inadequate as compared to that in other Departments, in which the educational qualifications are no greater, and in several cases very inferior, to those required for the Geological Department.

As to pension and furlough, the Department comes under the general Uncovenanted Service Code. The furlough rules are liberal enough, but the pension rules have long been a standing grievance. As framed for the great body of subordinate officials, almost exclusively recruited in the country, the pensions are wholly unsuited for a very scientific service that can only be recruited by very careful selection from young men of high education in Europe. It has frequently been represented to Government that the Geological Department ought to enjoy at least as good pension rules as the Public Works Department. With low pay and bad pensions comparative penury awaits us at home among quondam colleagues, whose service in India was in no way more arduous or responsible than ours.

III.—Geology has of course a small nomenclature and terminology of its own, but it is singularly free from requirements that can properly be called technical? The Geologist always works with ready-made maps, and the only operation he has to perform is to take the dip of a stratum or vein with a clinometer and a pocket compass. To sketch well is a very useful accomplishment for a Geologist, but by no means essential. The technical profession most related to Geology is mining, but in so far as operative this is a branch of Engineering: only the guiding information as to the deposit in hand being furnished by Geology; and it is similarly a most useful, or even essential, guide in many engineering projects. The business of Geology is to understand all about the substances forming the crust of the earth; and as these are the very complex result of the slow operations of nature throughout past time, the understanding can only come through a knowledge of those operations, *i.e.*, of the combined action of all the various modes of motion or force concerned in the formation of the earth. The basis of this knowledge is the Physical Sciences (Mechanics, Heat, Chemistry), and, as concerning fossils, the Biological Sciences. This of course implies that Geology has several special lines of research for which a mastery of one or more particular sciences is needed; but for the intelligent performance of any Geological professional work a sound knowledge of Physical Science is essential, and the work is worthless or good in proportion to that knowledge. It should be apparent, too, that having to deal with such complex and often obscure facts, the Geologist stands much in need of the broad judgment and sense of proportion that is the best result of education. Unless the Geological Survey of India can turn out work up to the mark of the sciences of the day, it were better to abolish it.

IV.—Owing to the very vague popular notion of Geological work, especially as linked to that common word "survey," I receive applications from all sorts and conditions of men; but they are promptly reduced to one class by the test of scientific education, as already explained. On the subject of the employment of Natives in this Department, I have already (on the 21st March) submitted a memorandum for the consideration of the Commission. If the Native mind is to be broken in to scientific work, the process must begin, as for other people, at the bottom, with the more mechanical sciences, not at the top, with so very complex a science as Geology. This is only common sense, and all experience has confirmed it.

V.—The existing organization and constitution of the Department is given in the following table as prescribed :

Existing Organization and Constitution of the Scientific Department.

1	2	3	4						
			NUMBER OF APPOINTMENTS IN EACH CLASS OR GRADE NOW HELD BY						
			1	2	3	4			
						NATIVES OF INDIA.			
Department.	Total number of gazetted appointments, or of appointments not being purely clerical, with salaries of Rs. 100 and upwards.	Distribution of the gazetted appointments and the other appointments mentioned in column 2 amongst classes and grades, with rate of pay attached to each.	Europeans not domiciled in India.	Europeans domiciled in India.	Eurasians.	(a) Hindus.	(b) Mahomedans	(c) Others.	(d) Total.
Geological Survey of India.	The sanctioned number of gazetted appointments is 17. There are at present 3 vacancies in the lowest grade.	Rs. Rs. 1 Director ... 1,500— 3 Superintendents ... 800—1,100 1 Senior Deputy Superintendent ... 700—1,000 5 Deputy Superintendents 500—700 *6 Assistant ditto ... 350—500 (3 vacant now)	1 3 1 4 3	...	...	1	...	...	1
	5 non-gazetted appointments.	1 Palæontologist ... 500—1,000 2 Sub-Assistants on ... 150—200 1 Registrar on ... 240—400 1 Artist, vacant ... 250—400 1 Museum Assistant ... 100—250	1 ... 1	...	1	2	...	...	2

* One of the vacancies in this grade is kept open to furnish the pay of 2 Native Sub-Assistants, Punjabi Sikhs.

(Sd.) H. B. MEDLICOTT,

Director, Geological Survey of India.

Further Note by the Departmental Member.

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Section II.

To facilitate the inquiry undertaken by the Commission as affecting the Geological Department, I have the honor to submit, for the consideration of the Members, a copy of a letter (No. 292), dated 17th July 1886, addressed to Government upon this question, also a copy of the last Administration Report of this Department, in which (pages 11-13) I have given an abstract of the case. I would now add a few remarks in further elucidation.

2. A correct judgment depends, in the first place, upon a proper understanding of Geological work, regarding which there is much misapprehension. The word 'survey' is popularly misleading, as suggesting mechanical operations with which the Geologist has really no more connexion than has the tourist who makes use of a map. Geological work is wholly scientific, and peculiarly of the higher interpretative character, as distinguished from the mere description and classification of natural objects. Moreover, on account of the often vague and scattered nature of the data it deals with, Geology in a very special degree demands caution and conscientiousness in the observation and discussion of such data (see paras. 3 and 4 of the annexed letter). It was because of this obscurity and complexity that it became the newest of the sciences.

3. The judgment to be formed depends, secondly, upon a correct estimate of the fitness of the Native. This point is really much more within the range of popular apprehension, but unfortunately it is very difficult to clear it of assumptions, prejudices, and feelings. As having been forced to take a decided stand in this question, I am probably taken to be violently one-sided; but I can confidently appeal to every Native who knows me against such an opinion. I was so fascinated with the zeal and plausibility of our first Bengali Assistant, that I treated him with exceptional favor. In the second year of his service I got him appointed temporarily as Natural History Secretary to the Asiatic Society, whereby he came in for the honor of writing the Natural Science section of their centenary volume.

4. As the question is to be decided upon definite questions of fact, I would insist upon the due recognition of the fact that underlies the whole contention, *viz.*, that there is a difference between the European and the Indian, and that at least one leading feature of that difference is the possession and application of knowledge, *i.e.*, of science, as compared to barren learning. There is a vulgar belief that such a difference is only a question of teaching; that knowledge has only to be presented to the mind (assumed as an entity common to all) to be appropriated, but there are some very telling facts against this view. Since 1822 there has been a Medical School in Bengal: the Medical College was founded in 1835, more than 50 years ago, so that quite two generations of Bengalis have had the advantage of teaching in several branches of science. The grandfathers of recent graduates might easily have been fully qualified M. D's. Yet of all that succession of students not one has made the smallest mark in any of the sciences concerned. It is important to notice that this teaching was not mere book learning, such as can qualify for the University examinations; it was practical professional instruction, such as that which in England inspired the minds of Darwin and Huxley. I am not asserting that Natives are for ever incapable of scientific work. I would be the last to insist upon fixity in such conditions, but I do maintain that, in the face of such experience, it is most injudicious to force Native Assistants into a small service in which scientific work is a *sine qua non*. It is beginning at the wrong end. No Native has yet been thought fit to take charge of an ordinary Topographical Survey party, yet he is presumed to be fit for Geological investigations.

No. 292, dated Calcutta, 17th July 1886.

From—Dr. W. King, D.sc., Director of the Geological Survey of India.

To—The Under-Secretary to the Government of India, Revenue and Agricultural Department.

I have the honor to acknowledge the receipt of your letter No. 522-97S., dated 11th ultimo, with correspondence, intimating that an appointment as Assistant Superintendent on the Geological Survey of India has been promised to Babu Man Mohan Lal on completion of his studies in England. In view of the repeated representation submitted by me during the last 15 years of the unfitness of Natives for Geological work, and of the confirmation of the same by actual experience, I deem it my duty formally to record my disappointment at a measure that must to its full proportional extent destroy the efficiency of the Department I have the honor to direct.

2. I must only suppose that those who decide these questions do not understand the merits of them; and I have no right to be surprised at this, for it would require a real apprehension of scientific work on its more exact side. It may well seem unintelligible to able administrators that the Natives, who have often shown decided ability and wisdom in the weighty matters of law and of civil administration, should break down in such a simple thing as Geology. Yet the solution of the enigma is not far to seek: the former practice still turns almost exclusively upon the old-world processes of thought, the spontaneous working of the illative sense upon the accumulated experience of human concerns, and here the Natives have inherited a quite unadulterated stock of shrewdness and of lore; whereas Geology is the latest product of modern science—of conscious and formal inductive reasoning as the only clue to positive knowledge. Geology may not be itself an exact science, but all the special sciences are the instruments with which its complex interpretations are worked out. Now, the Natives have exhibited a complete inaptitude for science proper in any shape, and not for want of opportunity. For many years past they have had special training in several branches of science (Botany, Chemistry, Physics, Mechanics), and also more or less of practical opportunity of bringing this knowledge to bear fruit in the Medical and Engineering Services—the

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same sort of teaching and opportunity as have elsewhere given rise to many leading men of science—yet the result in what could be called scientific work has been absolutely *nil*. The proximate explanation is now almost as plain as the fact itself is indisputable: it is that the constitution of mind, the key-note of rising thought and civilization, which it has taken many generations to bring forth in the West, cannot be suddenly transplanted into men who have till now been nurtured exclusively in the crudest superstitions. That the mind is a *tabula rasa*, ready to receive whatever knowledge may be presented to it, is a psychological fallacy long since abandoned, and the change in question is the greatest the world has ever seen. Verbal or notional acquisition may be exercised upon the forms of science as well as in any other barren learning; and the marvellous facility shown by Native students in such acquisition without a grain of understanding is only a reflected proof of the inanity of the learning which could produce such confirmed sterility of intelligence. I did think that these more or less familiar facts and views would have some effect with men in whom at least general information cannot be wanting in deterring them from forcing Natives into a small service in which scientific work is a *sine qua non*.

3. In previous correspondence I have been careful not to leave this point unexplained. I have shown that the preliminary classificatory work—which must be called scientific in a lower degree, and for which, as being only the proximate co-ordination of tangible objects, Natives might have some aptitude (though it has not shown itself)—stops short of the Geological standard. The correct description of mineral species serves some purpose in indicating molecular forms and affinities; the description of species of fossils extends and prepares the data for Biological studies; the determination of the composition of rocks (mineral aggregates) would to some extent clear the ground for the Geologist; but all these performances are absolutely barren until they are turned to account by the higher science which brings to light the morphological and functional relations which are the basis of the life and regulate the growth or conformation of these diverse objects. Now, this aspect is the one that characterizes Geology. Geology may be said to have introduced Natural Science to this fruitful field of research—to have, in fact, put life into the dry bones which would otherwise be miscalled 'Natural History.' It is essential here to note that the scientific student can only in the roughest way build upon the preliminary work of the mere classifier, much as he might in a library make use of a catalogue of the books. He can only trust what he sees himself, for he alone can observe what to others has no existence; his is the only 'real apprehension,' as revealing a nexus in what is to others merely formal, or else notional (and practically barren) in those who repeat the revelation without understanding. These indications are completely illustrated by Geology itself; to all but the Geologist one stone is much the same as another, a meaningless lump of matter, called stone as distinguishable from metals or gems; but to the Geologist every stone declares a life-history, after its kind, simple or complex, according to the traces in it of the vicissitudes of the earth's history in which its ingredients have taken part. These interpretations give the only estimate that can be formed of the extent and condition of the mineral deposits constituting the earth's crust; and they are correct or false according to the observer's knowledge of the conditions and the forces of nature that have combined to make up the earth as we find it. All this may read like 'tall talk,' but it is the simple truth of the matter. However far we may fall short of the standard, no man is fit for Geological work who cannot make some intelligent approach to it; and to expect this from a Native is to bid defiance to all reason and experience. It is also the worst way to attain the proposed object for the Natives themselves: they are quite conceited enough (witness Babu Mohan Lal's application to be taken on in the higher grades) without giving them to imagine that they can possibly be fit for the more complex forms of scientific work before they have shown the smallest capability for independent work in the simpler sciences. Geology is, moreover, peculiarly unsuitable for a first training ground in science on account of the unavoidably inexact partial and scattered condition of the data upon which its conclusions have to be based. It gives any amount of scope for long-winded disquisition upon superficial observation, whereby the veriest impostor may make a plausible show of work—the besetting weakness of the Native. The trustworthiness and soundness of the worker must be in proportion to the obscurity of the material he has to deal with. No one who understands all these conditions would dream of proposing Natives for a Geological Survey.

4. Nor have I omitted in previous discussions of this question to explain the common misunderstanding suggested by the word "survey." It is of course especially the duty of official Geologists to delineate the distribution of useful minerals as well as of other natural groups that may deserve distinction, and this process is conveniently called 'mapping,' though the Geologist always works with such maps as are already made. This business is, however, only a by-product, though of course a necessary one, of Geological work, which is to understand and expound the rock structure as a whole. If we were able, with a gigantic camera, at suitable focal distances above ground, to take a series of photographs of a country, the result would be a complete topographical map. For want of this instantaneous process all the laborious measurements of survey work have to be undertaken to produce a less complete map. If by the same instantaneous process we were able to take a picture of the superficial distribution of the several rock formations (which would of course be impossible owing to concealment by superficial coverings), we should only obtain what might by courtesy be called a geological map, for we should still know nothing of the nature or structural relations of the rocks, and the labour involved in the Geological study of the ground would hardly be sensibly reduced. Thus, there is no object worth mentioning in Geological Survey work short of an intelligent study of the rocks, and the man who is not competent for this is simply an incumbrance. Any simple boundary mapping he might perform through being able to distinguish one stone from another leaves us in ignorance of what might have been learned from the ground he has traversed; the result is to that extent a delusion, and were better left undone; it fulfils no purpose, scientific or practical.

Geology then is unique in having no work that can be performed by rule; every act in its service must be one of informed judgment.

5. However sound the foregoing arguments may be, and although including an appeal to the already proven sterility of the Native mind for scientific work when fair opportunity has been given in lines far more simple than Geology, practical men might still plausibly, from their point of view, insist upon actual trial in this particular work. But on this point too the case is already complete. From the printed official list of officers of the Geological Survey of India (comprising all drawing Rs. 100 and above), it will be seen that out of a total of 18, three (*i.e.*, $\frac{1}{6}$th) are Natives, and they are all on the Scientific staff, *i.e.*, employed in the field. For nearly 12 years we have had two Punjabis from the Lahore College, picked men of their class, of the same stamp as enter the upper grades in the Engineering and other branches of the Service. For the last 6 years we have had a Bengali, a Gilchrist scholar, a B.Sc. of the London University, who attended the Geological classes at the Royal School of Mines, and who actually attempted Geological work in England, and became an F. G. S. The former two were forced upon us in spite of earnest remonstrance on the grounds of antecedent incompatibility (as above explained); the latter I myself invited as a test case, the most favorable that was likely to occur in disproof of my own contention—a Native who had spontaneously taken to Geological work. I would invite enquiry as to whether these men have not had fair play; they are all exceptionally smart Natives; they write English more fluently than some of our Englishmen, yet they must be pronounced lamentable failures for the work required of them.

* * * * * * * * * * * * * *

These crucial experiments were fully before Government when they decided still further to encumber this small and very special Department with Native Assistants.

6. That such an array of judgment and experience should be set aside—on the strength of a suggestion from the Science Teacher at the Muir College that * * *, who had attended his class for one year, would be a good man to train for the Geological Survey—would certainly appear very strong proof of the determination of the Government to bring Natives into the Service; but a comparison with other departments suggests that this explanation is insufficient. Take, for instance, the Survey of India: it would certainly be called a Scientific department, as undoubtedly its operations are based upon the most exact of sciences—Geometry; it would thus form an admirable school of practical science for Natives; its methods are rigorous, and results are easily checked; there is the further great practical advantage that its work can be thoroughly carried out under hard-and-fast rules without any understanding. If we now turn to the official list of officers of that Department, it will be seen that out of a total of 262 (*i.e.*, 14·5 times that of the Geological Survey), only 19 (*i.e.*, 1 : 13·8) are Natives; but these 19 are all under the heading 'Technical and Ministerial Officers' (clerks, accountants, draughtsmen, computers). Of the 243 employed in the field, not one is a Native. If the determination aforesaid were genuine, it would have to be supposed that the Surveyor General has satisfied the Government that Natives are unfit for that employment; but as I am unable to imagine any argument to that effect that would not apply with centuple force to the Geological Survey, I am compelled to reflect that this latter Department is treated with much unfairness; that as unprotected and misunderstood, it is victimized, because certain officials have not strength to resist the importunity of Natives for appointments they are hopelessly unsuited for, or, on the other hand, to compel the employment of them where it is at least possible their services may be turned to some account.

7. I would solicit that this respectful remonstrance at a measure that must end in the ruin of this Department may be laid before all those who are responsible for it.

No. 196, dated Calcutta. 11th May 1887.

Demi-official from—Dr. W. King, D.Sc., Director of the Geological Survey of India,

To—The President of the Sub-Committee, Public Service Commission.

In answer to your letter of the 6th May, received to-day, I beg to state that I am at the convenience of the Sub-Committee of the Public Service Commission at any time that may be settled on for the enquiry into my Department.

Mr. Medlicott, my predecessor, who only retired on the 27th of last month, was I know prepared for this enquiry when the Sub-Committee was in Calcutta, and it seems almost a pity that opportunity was not then given him for taking part in it, as he had had so long an experience as Director. He has, however, already expressed his views on the subject of the admission of Natives into the graded appointments of the Survey in his letter No. 122 to the Secretary, Public Service Commission (dated March 22nd last); and I may myself take this opportunity of stating that I am in accord with him in the main. The question of admission to subordinate or non-graded appointments is open to freer consideration.

Mr. Medlicott's report on the conditions of service in the gazetted ranks of the Geological Survey, forwarded to the Revenue and Agricultural Department with his letter No. 142, dated 13th April 1887, is, I presume, in your hands.

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Section III.

Dr. William King, D.Sc.

Section III.—Sittings at Simla.

WITNESS No. 1—*13th June 1887.*

Examination of Dr. WILLIAM KING, D.Sc., Royal University, Ireland, Director of the Geological Survey.

The *President.*

When did you join the Department?—In 1857. I received my first appointment from the Court of Directors on the recommendation of Dr. Oldham, the then head of the Department. I joined the Department in Calcutta, and in March of the same year was posted to the Madras Presidency, where I served for 25 years. I was subsequently transferred to the Central Provinces, and was working there until I received my present appointment.

What are your views as to the constitution of the Department?—I think it is calculated to meet all requirements. It must be remembered that it is a highly scientific Department. It is therefore almost indispensable that its officers should be recruited from European Universities, or selected from the School of Mines; but preferably they should be University men, as such men are much more likely to hold broad and liberal views on the subjects they have to treat about than men merely trained in a special school. Of course I mean University men who have received special training in some branch of Geology, either on the chemical, the physical, or the palæontological side. An officer should also be a fair draughtsman and a surveyor. The method of appointing to the Department is thus: The Secretary of State causes notice of a vacancy to be published to the Universities and the School of Mines inviting candidates. There are two referees, of whom one is the Director of the South Kensington Museum, Professor Forester, the other selected by the Government of India, Mr. Blanford, who was formerly a member of the Department. It is the duty of the referees to judge of the candidates' qualifications in order that they may assure themselves of their efficiency and the probability that they will make suitable officers of the Department in this country; and where there is more than one applicant, to recommend the best qualified to the Secretary of State. Ever since the Secretary of State has had the making of appointments to this Department until lately, there was an understanding that a five years' probation would be undergone by gentlemen appointed; but this rule was never actually carried out. The present rule is that men must undergo a two years' probation after appointment, and will not receive a permanent appointment if found incompetent. This rule also has not up to the present been carried out, as the occasion has not occurred for enforcing it. But it is my intention, so long as I am head of the Department, to insist rigidly on its being adhered to. At present there are four vacancies in the graded list of the Department. Two of these appointments are kept in abeyance—one in order that the salaries of the Sub-Assistants may be provided, and the other to pay the cost of Palæontological work—the appointment of Palæontologist having only been filled up this year. There is one Director and three Superintendents (1st grade) with one 1st grade Deputy Superintendent. Originally there were four 1st grade Deputy Superintendents, but three of them have been made Superintendents. There are five appointments in the 2nd grade, all of them filled, and six in the 3rd grade, in which the four vacancies occur of which I have spoken. The two Sub-Assistants were introduced as an experiment a good many years ago as a result of the recommendation of the Bengal Government that Natives should be employed in the Department. The appointment of Palæontologist is a special appointment, and the Palæontologist rises in the grades with the Geological Surveyor proper. There are two other appointments not yet filled up; one, however, is practically filled up by the nomination of a Native by the Secretary of State. Mr. Dutta, the gentleman referred to, is a Gilchrist scholar, and obtained his appointment to this Department on the recommendation of a Professor of Geology in Great Britain. Practically there are two Natives now promised appointments in the Department in addition to Mr. P. N. Bose, who is now in the 2nd grade.

The *President*—contd.

The Hon'ble Mr. *Quinton.*

Practically the total number of appointments in the Department is fourteen and two Sub-Assistants?—Yes; at present. Of the non-graded appointments, the first is that of Artist: the duties of this officer are to make drawings of fossils and to prepare plates for publication of the survey. The second officer is the Registrar, who is Secretary of the Department and also Librarian. The two Sub-Assistants are employed in the field to map out detailed work that is shown them. We have also a Museum Assistant whose duties are indicated by the name of the appointment. Of the two graded appointments, the two Sub-Assistantships are held by Natives, Sikhs of the Punjab. For the work which the gentlemen have to do, they are efficient. One of them has a very good practical acquaintance with the coal rocks of a particular system. His experience has been gained principally in Rewa.

What is your opinion as to the fitness of Natives for employment in this Department?—For Sub-Assistantships, I think we can select men who can be made very useful; but as regards the higher grades, I do not think that the Native, even by education in Europe, is fit for such appointments. My opinion is, however, of little avail when my hand is practically forced by the nomination and appointment of two additional men (already referred to).

At present the educational opportunities are not sufficient to instruct men to the degree and with the accuracy which is requisite for efficient service in this Department. Whatever appointments are made must be made from England of men who have gone through the same course as we have. This is a Department in which if the work is not accurate, it is absolutely worthless. Geology is not an exact science, and it requires therefore a more careful and accurate recognition of the materials of which the earth is composed, and also considerable care in generalization on the facts that are

The Hon'ble *Mr. Quinton*—contd.

presented. These facts are differently presented in various regions. In India they are often quite differently exhibited to what they are in England. To take a simple instance, what you would call granite in England you would probably find was not granite in India. A man well educated on the subject of granite in England when he came out to this country, if he did not take particular care and thoroughly study all the relations of the rock in the field, would be liable to make considerable mistakes.

Sir *Edward Buck.*

Your observations I suppose apply to Europeans as well as to Natives of this country?—Oh, yes. I have reason to believe that one of the Native gentlemen who will shortly join the Department is a man who may make a good officer. I entertain no prejudices against Natives; in fact, I rather like them from what I have seen of them, and I have had a great deal of experience of Natives of all kinds.

The Hon'ble *Mr. Quinton.*

The gentleman you allude to has received an English education?—Yes; he was in England for five years.

The *President.*

Have you been Examiner for any of the Universities?—Yes; I examined for the Madras and Calcutta Universities.

What is your opinion of the education in Physical Science which is at present given in India so far as you have been able to judge?—I have only examined in Geology. Practically there is no teaching at all in Geology. One of the men I examined last in Madras took up Physical Science for the M. A. degree, it being the subject most easy to master; but he did not pass. How could he? He had never had any real teaching; he had never seen any rocks. We have had to instruct the two Sub-Assistants we have now in the Department.

Have you anything to say about pay and pension in your Department?—The pay and furlough rules are satisfactory; but our pension rules bear very hardly on us, and we ought, I think, to be placed on the same footing as the Public Works Department in this respect. The only controlling

The *President*—contd.

appointment that a man in our Department can rise to is that of Director of Survey. In other Departments he may hold executive or administrative appointments of gradually increasing importance; but until the 25th April last, I was expected to do the same work at 53 that I was doing at 23. In this Department there is only one controlling appointment; the others are all executive.

The Hon'ble *Mr. Quinton.*

The fact that men are kept on doing executive work up to an advanced age is prejudicial to the Department?—Yes; instances have occurred of men being retained in executive work after they had become practically useless.

The *President.*

What do you think of a system of appointing men to the Department for a term of years on higher salaries and without pension?—I have often thought of that; but man is human, and he will never save money. If all pensions were abolished, I should not object to the system suggested; but so long as the pension system is retained, I certainly think the Geological Survey Department ought to have the same rules as the Public Works Department. I should observe that our object is, if possible, to obtain men for the Department who have already acquired a European reputation for special branches of study. We have at present a special Palæontologist temporarily employed for the Salt Range, in addition to the gentleman I have already mentioned. He was formerly in the Department, but having been obliged to relinquish the service owing to ill-health and to return to Europe, he received an appointment as Professor of Palæontology in the University of Prague. He has since been specially employed by the Department to report on the Salt Range fossils discovered by him when he was in the Department. In addition to him, we have other Palæontologists employed temporarily for special works; and there are Palæontologists in Europe who are so good as to assist us voluntarily. For instance, we are indebted to Professor Huxley, Professor Duncan, and other scientific men in England for notes on the various fossils which have been found in India and submitted to them for investigation.

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P. N. Bose, Esq.

No. 1—Note by P. N. Bose, Esq., B.Sc., F.G.S., Deputy Superintendent, Geological Survey.

So long as adequate provision for the teaching of Geology and the allied sciences be not made in the Indian Colleges, appointments to the higher grades should be made by the Secretary of State in England as at present, irrespective, I need hardly say, of the nationality of the candidates.*

Though the scientific teaching in our Colleges falls far short of what is requisite for higher work, it produces men quite competent to do a good portion of such work as tracing out detailed boundaries, fossil-collecting, &c. I would propose that the number of Sub-Assistants be increased from two (the present strength) to ten or twelve. The Sub-Assistantships may be filled up either by competitive examination, or by selection from among the Science Graduates of the different Indian Universities who have studied Geology for their degrees. If found qualified, the Sub-Assistants should be promoted to the higher service.

* The scientific portion of the committee proposed in my note for Educational appointments may act as referees for Geological appointments

SCIENTIFIC DEPARTMENTS.

PART III.

ARCHÆOLOGICAL SURVEY.

PROCEEDINGS

OF

THE SUB-COMMITTEE,

PUBLIC SERVICE COMMISSION.

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Section I.—Note by the Sub-Committee.

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About 43 years ago, the Government of Bombay, at the instance of the Court of Directors, entrusted to a Commission the task of investigating the cave or rock temples of Western India. Owing to the incompetency of the staff engaged to make drawings and copy and translate inscriptions, the results were considered incommensurate with the expense, and the work was abandoned. In 1862, Major (now General Sir Alexander) Cunningham, R.E., was employed to make an Archæological Survey in Upper India. In this he was engaged for some few years, and collected important historical and geographical information, but did little to illustrate architecture and art, and during the Viceroyalty of Lord Lawrence the survey was discontinued.

The origin of the existing Department of the Archæological Survey is explained in a Resolution of the Government of India, No. 649—650, dated 2nd February 1871.

In accordance with instructions received from the Secretary of State, measures were initiated in 1867-68 for the conservation of old architectural structures, and for the exploration and systematic record of the numerous valuable and interesting memorials of the ancient civilization of India. As an experimental arrangement, four separate parties were to be organized for Madras, Bombay, Bengal, and the Upper Provinces, the Department of Science and Art in London having undertaken to defray a portion of the expenses that might be incurred in securing authentic descriptions, as well as casts and photographs of the finest monuments of Indian Art. A sum of Rs. 13,000 was allotted to each of the four circles for the survey of antiquities, it being contemplated that the Superintendents of the Schools of Art should co-operate with the survey parties; but the scheme was found impracticable.

In a Despatch dated 11th January 1870, the Secretary of State strongly urged the necessity of directing the researches in a somewhat more systematic and deliberate manner than had been attempted heretofore, and of concentrating the supervision of the entire system in one Department, instead of leaving it, without control, to the management of different officers under different Local Governments. The Governor General in Council concurred in the opinion expressed by the Secretary of State as to the steps that should be taken for the conduct of future researches, and came to the conclusion that it would be impossible to attain the desired object without a central establishment to collect the results of former investigations, and to direct and systematize the various efforts and enquiries made by local bodies and private persons, as well as by the Government itself. These views were communicated to the Duke of Argyll. It was added that there was no one so well qualified for superintending the operations as Major-General Cunningham, who was then in England; and that if that gentleman would accept the post of Central Agent or Director for a few years, it would give an impulse to the study of Archæology, and make the future working of the scheme comparatively easy.

On the invitation of the Secretary of State, Major-General Cunningham accepted the appointment of Director General of the Archæological Survey in India for five years; and the Governor-General in Council considering that the time had arrived for deciding on some fixed and definite system of archæological research, which might be steadily prosecuted year by year in such a method as was likely to be productive of the most useful results, issued the following Resolution:

"Although much has already been done by previous inquirers, still more yet remains to be accomplished; for the efforts of private individuals, which are entirely dependent on opportunity and inclination, are necessarily unconnected and desultory. What is now required is a complete search over the whole country, and a systematic record and description of all architectural and other remains that are remarkable either for their antiquity, or their beauty, or their historical interest.

"To carry out these views, General Cunningham's attention should be directed to two principal objects—*first*, the preparation of a brief summary of the labours of former inquirers, and of the results which have been already obtained. Much valuable information exists in the researches and journals of the different Asiatic Societies; but it is so scattered over several

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hundred volumes, many of which are rare and expensive, that it is now practically accessible only in large public libraries. A brief record of what has already been done would save present inquirers the loss of much precious time in the measurements and description of many of the finest monuments of India. *Secondly*, the preparation of a general scheme of systematic inquiry for the guidance of a staff of Assistants in present and future researches. The scheme should indicate what has already been accomplished, and what remains to be done. It should give clear and detailed instructions as to the nature and amount of information, as well as to the style of illustration required for all known remains. It should also lay down the order in which these researches should be followed up, by forming into different compact groups all the places to be visited, so that as little time as possible should be lost in travelling.

"A report of each year's proceedings should be drawn up by General Cunningham, and submitted before the commencement of the next year's operations. This report need not be accompanied by any long detailed drawings and illustrations, but it should indicate clearly the nature and amount of work done during the year, and should state generally the value and importance of the information acquired. The collection and arrangement of the materials contained in these annual reports, with the results obtained by former and independent inquirers will form another branch of General Cunningham's duties. This work cannot be begun for some time, but the object should be kept steadily in view. It is, therefore, desirable that the efforts of some of the Assistants should at once be directed to the completion of our knowledge of the older remains of India, so that the Archæological Survey may be able to publish a volume of Buddhist and other antiquities at an early date."

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"As regards the establishment to be entertained, although the services of one or more European Assistants may prove indispensable, His Excellency desires that, so far as possible, intelligent Natives may be employed in and trained to the work of photographing, measuring, and surveying buildings, directing excavations, and the like; while as regards deciphering inscriptions, it seems probable that Natives may be found better qualified to do this work than many Europeans, whose services could be at present secured for such employment in the Department."

It has been necessary to give a detailed account of the instructions issued to General Cunningham on the institution of the Department, inasmuch as the results obtained during his administration have been adversely criticised by the witnesses who favored the Sub-Committee with their opinions.

During General Cunningham's administration, twenty-two volumes of reports were issued, which, with the exception of the two first compiled by him before his appointment, the Sub-Committee is informed, contained much trivial narrative and crude theory, the work of his inexperienced Assistants. General Cunningham's operations were mainly, if not altogether, confined to Northern India. In 1880, Major H. H. Cole, R.E., was entrusted, for a period of three years, with the work of conservation of ancient monuments in India. Major Cole's appointment lapsed in November 1883. In 1885 General Cunningham resigned his appointment. Meanwhile, in 1873, Dr. Burgess, C.I.E., the present Director of the Department, was invited to undertake the survey of the monuments of Western India, and report on their condition. Dr. Burgess had been trained as an architect, but had been obliged by the condition of his sight to relinquish the profession and betake himself to science and educational work. Between 1861 and 1873 he had devoted much attention to Indian architectural antiquities, and published several works on the subject. The districts assigned to him were the Bombay Presidency with Sind, the Berar, Hyderabad, and the Central Provinces. Dr. Burgess carried on these operations independently of any control by the Director General of the Archæological Survey of India.

In 1881 the survey of Southern India was also placed under the direction of Dr. Burgess.

In view of the pending retirement of General Cunningham, the Governor-General in Council decided on the reconstitution of the Department in a Resolution No. 2—87-103, dated 6th June 1885, which recognized the objects of the Department as being the "further survey and conservation of the ancient monuments of India, and the acquisition and translation of ancient inscriptions." It was determined that, for the future, the work of exploration and conservation, which had been separated during the engagement of Major H. H. Cole, should be consolidated to the extent and in the manner explained in the Resolution. Excluding the Madras and Bombay Presidencies, where the existing arrangements under Dr. Burgess were to remain unaltered, the remaining Provinces of India were apportioned for the purposes of the Department into three divisions—(1) the Punjab, with Sind and Rajputana; (2) the North-Western Provinces and Oudh, the Central India Agency, and the Central Provinces; and (3) Bengal, with Assam and Chota-Nagpur. The object of the adoption of these divisions, to each of which a small independent survey party was to be assigned, was to concentrate the operations of each party within a clearly demarcated area, and avoid the difficulties which had been found to arise from the operations in different parts of the same Province having been entrusted to separate management.

It was, however, recognized that it might be necessary for certain scientific purposes, such as the classification of the architecture of a dynasty, that a survey party should carry its work beyond the limits assigned to it, and it was declared that the institution of divisions was not intended to interfere with such proceedings if they were deemed necessary by higher authority. It was observed that provision had not been made for extending the operations of the Depart-

ment to the territories of His Highness the Nizam and the Hyderabad Assigned Districts; but, in view of Dr. Burgess' acquaintance with the country, it was thought that arrangements might thereafter be made for the prosecution of the survey in Hyderabad by the Bombay party after it had completed its work in that Presidency.

The strength of each survey party was fixed on the following scale :—

Surveyor on	Rs.	600—25—700
1 Assistant Surveyor	"	300—25—400
1 Draftsman	"	180—10—220
1 Writer on	"	50

To each party there was also assigned an allowance of Rs. 920 a year for contingencies, and Rs. 2,000 for travelling allowances. Dr. Burgess was constituted the head of the entire Department, but was to continue to carry on also the detailed work in the Madras and Bombay Presidencies.

The Surveyors were required not only to conduct the work of survey, but also to advise as to the various monuments of antiquity or interest which might require to be preserved or restored. It was directed that the necessary repairs should be carried out under the general supervision of the Surveyors by the Public Works Department of the several Local Governments and Administrations, with whom the primary responsibility for conservation would remain as it then was. The Surveyors were to be on the footing of professional advisers to the Local Governments, with the right of initiating suggestions and calling attention to requirements. They were ordered to keep the strictly archæological portion of their work entirely separate from that relating to conservation, and to submit schemes for the preservation or restoration of monuments directly to the Local Governments concerned; and the Local Governments were to carry out any approved schemes in the Public Works Department with such money as they could make available for the purpose, supplemented by any grant-in-aid which the Government of India might be in a position to contribute. Each Surveyor was required to prepare in communication with Dr. Burgess, and to submit for the approval of the Government of India through the Local Governments concerned, before the commencement of each field season, a programme of the operations he proposed to undertake, and at the end of each season an annual report of the work done by his party. It was expressly ordered that all arguments and speculation based on the spelling of names, and similar considerations as to the identity of persons, places, tribes, &c., should be avoided, and that the report should be restricted as much as possible to a clear and accurate account of facts and discoveries.

Other arrangements having been made for preparing and editing the texts and translations of ancient inscriptions, which will be presently noticed, the Surveyors were directed not to attempt to translate any inscriptions which they might find, but to keep registers of them in the form prescribed, and of all inscriptions, whether on stone or copper, which might come to their knowledge, filling in particulars of the date or dynasty to which they were attributable only so far as they found themselves able to do so with a fair amount of certainty. They were also directed to send information to the Epigraphist to the Government of India as soon as a new inscription was found, with a full statement of the details necessary to enable that officer to study it, if he thought fit to do so.

In a Resolution No. 5—95-113, dated 15th March 1886, it was observed that, in the Resolution last before cited, no detailed explanation had been given of the relations in which Dr. Burgess would, as head of the entire Archæological Survey of India, stand towards the Circle Surveyors and the Local Governments, and that it appeared to the Governor-General in Council that, so far as the actual work of survey was concerned, it would conduce to efficiency if Dr. Burgess were recognized as occupying the position of Director General of the Department, and the local Surveyors were made directly subordinate to him; and, moreover, that, as the cost of the survey was entirely Imperial, it was essential in the interests of economy that there should be one executive head of the Department responsible to the Government of India for exercising a detailed professional check over the work done by the local Surveyors. At the same time it was considered desirable that the Local Governments should have every opportunity of knowing and of expressing an opinion upon the survey operations affecting their respective jurisdictions. It was therefore decided, in supersession of all previous orders, that all correspondence of the Archæological Surveyors, all estimates of expenditure, programmes of work proposed or reports of work done should in future be addressed to Dr. Burgess as Director General of the Archæological Survey of India, but should be forwarded through the Local Government under flying seal. Permission was accorded to the Local Governments, before forwarding correspondence so transmitted, to record any remarks or suggestions that might seem called for, and the Director General was prohibited from overruling or setting aside any such remarks or suggestions without a reference to the Government of India. Power was given to the Director General to make any modifications he might from time to time think fit in the subordinate establishments attached to the several survey parties, provided that the expenditure sanctioned for each circle was not exceeded and that his action was reported for confirmation by the Government of India.

As to the conservation of monuments, the orders of the Resolution of June 1885 were confirmed with the following additions : that a small provision, not exceeding Rs. 50 monthly, might be made in each Surveyor's budget for clearing out jungle growth, or performing such

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urgent petty works of conservation as might most conveniently be carried out by his party when surveying a monument; and that to secure for the Local Governments the best available advice in respect of such matters, communications addressed by the Surveyors to the Local Governments regarding schemes of conservation should be sent under flying seal through Dr. Burgess, who should be at liberty to call for any further information which seemed to him necessary, and should, when the case was complete, forward it to the Local Government with his own remarks, criticisms, and suggestions.

In October 1885, it appeared to the Government of India desirable to consider the arrangements to be made for the prosecution and completion of the Archæological Survey work in both the Madras and Bombay Presidencies, in order that a definite scheme might be laid down for the completion of the work within specified limits both as to time and cost. Dr. Burgess was accordingly requested, in consultation with the Governments of Madras and Bombay, to submit complete proposals for both Presidencies, bearing in mind the absolute necessity of restricting the cost to the lowest figure consistent with reasonable progress and efficiency. Dr. Burgess reported that much work still remained to be done in the Madras Presidency, and that it was not possible to estimate with any degree of certainty the period within which it was likely that the survey would be completed. He, therefore, proposed that the Madras Archæological Survey should be carried out somewhat on the same plan as the Archæological Survey of Northern India, the arrangements to be made for prosecuting the work being fixed for a term of five years, and being subject to reconsideration at the end of that period; that the work of conservation should be combined with that of survey, the duty of the archæological survey in the matter of conservation being restricted to suggestion, and the actual execution of conservation work being carried out by the Provincial Public Works Department.

Dr. Burgess estimated that the field work in the Bombay Presidency would be completed in five seasons, including the then current season, and that if the services of Mr. Cousens, the First Assistant, and of the Draftsmen attached to his party were retained for office work, in six years from the date of his report the work of the Archæological Survey in the Bombay Presidency, exclusive of Sind, would be completed.

In a Resolution No. 4-90—94, dated 15th March 1886, the Governor-General in Council sanctioned grants of Rs. 20,000 to the Presidency of Madras and Rs. 18,000 to the Presidency of Bombay for the prosecution of the survey for a term of five years on the basis of Dr. Burgess' proposals.

In July 1881, the Director General of the Archæological Survey proposed that active steps should be taken for the systematic arrangement and translation of the ancient inscriptions which had been collected in various parts of India, and recommended the employment of Mr. J. F. Fleet, of the Bombay Civil Service, in the publication of the texts and translations. He estimated the probable duration of such a special appointment at about ten years. The Secretary of State on the 29th December 1881, with his Despatch No. 224 (Statistics and Commerce), forwarded to the Government of India a letter from the President of the International Congress of Orientalists held at Berlin proposing such an undertaking as had been suggested by the Director General of the Archæological Survey. The Secretary of State expressly recognized that the promotion of inquiry into the sources of history, which in India largely consist of the contents of ancient inscriptions, formed at least a secondary duty of an enlightened Government, especially in a country where individuals with the means, leisure, qualifications, and tastes for such investigations were rare; but he cautioned the Government of India to judge of the proposal on a review of the whole expenditure that had been incurred in connection with Indian Archæology. The Government of India supported the proposal of the Director General for the appointment of Mr. Fleet as Epigraphist.

In a Despatch No. 146, dated 21st September 1882, the Secretary of State sanctioned the appointment of Mr. Fleet for a period of three years, and observed as follows: "To make the most of Mr. Fleet's service during the sanctioned period, it will be well that he should be authorized to employ Native scholars under his supervision, within some defined moderate limit of expense, to assist in the preparation of his materials. It has indeed struck me that a work of this nature is precisely one on which it would be most desirable to turn Native scholarship to account more prominently, and that among the many Native students who receive instruction of a high class in our various educational institutions, we might fairly look for some qualified to take an important part in such tasks. It may be that there are none available at present who are qualified to carry out such an undertaking independently. But I should be glad if one of the results of Mr. Fleet's employment during the next three years should be the training of two or three Native scholars in such habits of accuracy and critical judgment as should fit them hereafter for taking a prominent place in the prosecution of historical research."

The term sanctioned for Mr. Fleet's special employment as Epigraphist came to an end on the 13th January 1886, but was extended by the Government of India to the 31st May 1886, from which date, owing to financial exigencies, it was felt necessary to bring it to a close. In view of the discontinuance of Mr. Fleet's employment, the Government of India decided to arrange through Dr. Burgess for the deciphering and translation of inscriptions by experts in

Europe and elsewhere; and, in its Resolution of the 15th March 1886, placed at Dr. Burgess' disposal an annual grant of Rs. 6,000, with effect from the year 1886-87, in order to meet charges incurred in connection with this branch of the work. In forwarding his proposals for the future prosecution of the archæological survey in the Madras Presidency, Dr. Burgess, in consequence of the suggestion of His Excellency the Governor, Sir M. E. Grant Duff, recommended that Dr. E. Hultzsch, a scholar versed in the Sanskrit, Pali and Dravidian languages, should be engaged to translate inscriptions in those languages, and to train Pandits to assist in the work. The Government of Madras concurred in this proposal, and also in Dr. Burgess' suggestion that the work of searching for Sanskrit manuscripts, for which an annual grant of Rs. 3,200 had hitherto been allowed, should be transferred to Dr. Hultzsch. The contemplated expenditure on Dr. Hultzsch's pay and allowances was included in the lump grant proposed for the Madras archæological survey, and the appointment of Dr. Hultzsch was approved by the Resolution of the 15th March 1886, and subsequently sanctioned by the Secretary of State. No separate allowance was sanctioned for Assistants to Dr. Hultzsch to be trained in Epigraphy.

The Department, as at present constituted, consists of the following officers:—

	Rs.
1 Director General of Archæological Survey	1,500
Bombay Circle—	
1 Surveyor and Photographer	420—540
Madras Circle—	
1 Architectural Surveyor	350—500
1 European Epigraphist	400
Bengal Circle—	
1 Surveyor	625—700
1 Assistant Surveyor	325—400
1 Head Draftsman	180—220
North-Western Provinces and Oudh Circle—	
1 Surveyor	625—700
1 Assistant Surveyor	325—400
1 Architectural Assistant Surveyor and Head Draftsman	190—240
Punjab Circle—	
1 Surveyor	625—700

The Surveyor in the Bengal Circle is a Eurasian; the other officers in the Department are non-domiciled Europeans. The Madras Epigraphist, Dr. Hultzsch, and the Assistant Surveyor in the North-Western Provinces, Dr. Führer, are German scholars who were appointed for their reputation in Oriental studies. The Head Draftsman in Bengal is a Hindu. There are also employed in the Department twenty Draftsmen, principally students from the Schools of Art, of whom fifteen are Hindus, four are Mahomedans, and one is a Eurasian. The salaries they receive range from R30 to R65.

The Government of India having communicated to Mr. Fleet the suggestion of the Secretary of State as to the possibility of training Native scholars in such habits of accuracy and critical judgment as should fit them for dealing with ancient epigraphical records, Mr. Fleet, in a letter No. 7, dated 7th March 1884, addressed to the Secretary to the Government of India, Home Department, stated that he had been constantly on the look-out for some such men, both from the time when he first applied himself to that branch of study, and especially during the past year of his employment as Epigraphist, in order that he might take them in hand and train them and utilize them in his work, but that he had not up to that time met with any success. He observed that researches of that nature require not only a large amount of special reading beforehand, but also a thorough knowledge of English as well as of Sanskrit and other Oriental languages; and further a habit of criticism, which is of very rare existence among Native students, and which, where it does exist, can only be fully developed and turned to practical account by long and continuous exercise. He remarked that no attention was paid in the educational institutions of India to the study of Epigraphy and to researches into the ancient history of India; and that, consequently, the students on the completion of their education were almost invariably destitute of any inclination for such researches, or entirely unfitted to commence such researches with any practical result without a long preliminary study of what to them was an entirely new field of work. He considered that if he were to take such men in hand, he could train them only by forming regular classes and devoting several hours each day, with the result that he would have no leisure whatever for original work. He mentioned that the few Native scholars whom he regarded as at all fitted to begin such a course of training were men well advanced in years and in possession of positions and emoluments, which they could not resign for any appointments that could be offered them in connection with Epigraphy; and he came to the conclusion that the only feasible plan for meeting the wishes of the Secretary of State was the establishment in the Government Colleges of classes of selected students whom the Professors of Sanskrit should train in epigraphical and historical researches. He was of opinion that a sufficient variety of inscriptions had been published to enable the Professors to practise such students in the multifarious forms of alphabet in which Indian inscriptions are engraved, in the critical reading, transliteration and translation of inscriptions, and in the subsequent systematical arrangement of all the varied information, historical, political, religious, social, palæographical, linguistic, &c., obtained from the inscriptions.

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With such a preliminary training, he thought that a few students would be secured who would then be fitted to commence under him the more rigid study of critically examining newly discovered inscriptions, whether genuine or spurious, though ancient, and of translating and editing them in a proper scholar-like manner. The Government of India forwarded Mr. Fleet's proposals for the special training of Native students to the several Local Governments and Administrations, who took the opinions of their Educational officers on the project.

Mr. C. H. Tawney, M.A., Principal of the Presidency College, Calcutta, reported that he had consulted the Sanskrit Professor, Mr. Nilmani Mukerji, who thought that he would be able to acquire a competent knowledge of Indian Palæography in six months so as to undertake a training class, and who would be glad to commence a study of the subject if he were offered an addition, say of Rs. 100, to his pay. Mr. Tawney was, however, himself of opinion that it would be difficult to provide the Professor with pupils unless the authorities of the University were prepared to make Indian Palæography one of the subjects for the M. A. examination.

Babu Mahesa Chandra Nyayaratna, Officiating Principal of the Sanskrit College, Calcutta, observed as follows: "Epigraphy is a study which scholars, who have any real taste for archæological researches, may pursue without any help from teachers, especially in these days when several works on Indian inscriptions have been published, and it is possible to avail oneself of the labours of such consummate Archæologists as Prinsep, Rawlinson, Cunningham, and others. Dr. Rajendra Lal Mitra is a distinguished Archæologist and Epigraphist among Native scholars, and he owes the knowledge which he has of the art to his own exertions." He proposed the publishing, at the public expense, of a series of cheap but comprehensive text-books, containing all that had been done in this direction during the last fifty years. It would also, he thought, be desirable to open a class in Indian Colleges for the special training of a few selected students, but he doubted whether such a class would in the Sanskrit College be a success. The subject, he observed, included a much wider range than fell within the purview of Sanskrit Colleges, inasmuch as in India alone it would be necessary to deal with three classical languages, Sanskrit, Arabic, and Persian, with all their dialects, and few Professors could grapple with them all. If the work were confined to Sanskrit, it would dwindle down to reading old characters; but, even if so confined, few of the Professors at the College had had practice in reading them, so that he feared that they would not be able to render any material help to students. He added that the senior students of the Sanskrit College, who alone were qualified to join such a class, were already so much weighted in the race for University distinctions by their special course of Sanskrit studies that very few would be willing to take up a new course of study. He expressed his doubt if any students of the Sanskrit College would, without additional inducements in the shape of prizes or scholarships, be willing to come forward to avail themselves of the advantages offered by such a class, inasmuch as a knowledge of the art would not materially improve their prospects.

Dr. A. F. R. Hœrnle, Principal of the Calcutta Madrasa, stated that, having had some experience in Epigraphy, he would be happy to undertake to form a class of selected students for the study of that subject; but as the conduct of such a class would consume a great deal of time in direct instruction as well as in previous preparation, and as his time was already fully occupied, he must either be relieved of a portion of his tuition work, or receive a special allowance for the additional work imposed on him. He mentioned that the Head Maulvi of the Arabic Department, Abdul Hai, possessed some experience in reading old Arabic and Persian inscriptions, and would be a valuable assistant to him; but, he observed, he had assumed that students would be forthcoming to form a class, and he thought that some difficulty might be experienced in this matter, as epigraphical studies might not, at first sight, appear sufficiently remunerative.

The Director of Public Instruction, Bengal, considered the most feasible scheme to be the formation of a special class under Dr. Hœrnle's superintendence, and he recommended that if Dr. Hœrnle were employed on the proposed duties, he should receive increased remuneration.

The Lieutenant-Governor of Bengal, in forwarding these replies to the Government of India, expressed an opinion that the Government would not be justified in imposing this extra duty with the extra expense involved in it upon Dr. Hœrnle, unless there was some indication of a desire on the part of Native students to enter upon that particular branch of study. He thought it possible that such a desire might be stimulated by ventilating the wishes of the Government of India through the medium of the public Press, and also by moving the University authorities to take action. He accordingly undertook to address the Senate of the University on the subject, with what result does not appear from the correspondence laid before the Sub-Committee.

Dr. G. Oppert, Professor of Sanskrit in the Presidency College, Madras, considered that it was not feasible to train selected students in epigraphical researches in that institution unless the B. A. curriculum were altered. He observed that the position of the Indian Government Colleges was inferior to that of the Continental Universities, so that a comparison between the two was inappropriate—the Government Colleges in India, as at present constituted, corresponding to the gymnasia in Germany. He recommended that the Senate of the Madras University should introduce in the historical branches of the B. A. and M. A. courses and in the linguistic branch of the M. A. course the necessary changes in order to meet the proposals of the Epigraphist to the Government of India.

Dr. D. Duncan, the Principal of the Presidency College, Madras, agreed with Dr. Oppert that the Government Colleges were not at present in a position to undertake the work. He,

however, thought that, if provision were made for educating up to the M. A. standard of the University, something might be done in the direction proposed, but that in any case the co-operation of the University would be necessary.

The Syndicate of the Madras University expressed their opinion that Epigraphy might for the present be prescribed as a subject ancillary to history for candidates for the M. A. degree in branch V, and intimated that as soon as it was ascertained that there were candidates pursuing the study, the Syndicate would be prepared to prescribe it. They added that, when the resources of the University permitted them to do so, they would be glad to encourage the study by the foundation of a substantial prize.

Dr. P. Peterson, Professor of Oriental Languages in the Elphinstone College, Bombay, deprecated Mr. Fleet's suggestion that few Native scholars were trained to habits of accurate and critical judgment, and expressed his belief that a thorough knowledge of English as well as of Sanskrit and of other Oriental languages, with a habit of criticism, though not often found combined, were in India as often to be met with in a Native as in an Englishman, and he contended that a thorough knowledge of English was the very least of the qualifications required. He mentioned as an illustration that Pandit Bhagvanlal Indraji, Ph.D., who had to depend on others for getting his ideas and discoveries put into English, had done as much for the subject as other Archæologists who knew English better than they knew Sanskrit. As to Mr. Fleet's proposal he observed that he had no more leisure than Mr. Fleet to give classes of selected students the preliminary training suggested. He declared that the real cause of the difficulty which Mr. Fleet experienced lay not in the nature of the Native student, but in his circumstances, which compelled ninety-nine graduates out of every hundred in India, as soon as they had taken their degree, at once to turn to employment which would give them a livelihood. He pointed out that the course of studies prescribed at the college must be influenced by the University, and he expressed his conviction that any action the University might take would be confined to making the subject an optional one at the M. A. Examination, and that if it were not a compulsory subject, the Lecturer on Epigraphy would lecture to empty benches, as far as candidates for the B. A. degree were concerned.

Dr. R. G. Bhandarkar, of the Deccan College, professed himself unable to understand the reason for Mr. Fleet's failure to find suitable Natives to be trained for and utilized in Epigraphical Survey. Combating Mr. Fleet's opinion as to the necessity for a thorough knowledge of English, if it meant a greater knowledge of that language than was possessed by the Graduates in Arts, he maintained that an M. A. who had passed in Sanskrit, or a B. A. who had devoted special attention to Sanskrit, possessed an excellent knowledge of the language, and was thoroughly qualified to enter on the study of Epigraphy. He held that proof was afforded that a habit of criticism was not a rarity among Native students by the fact that many Native students had already distinguished themselves in the fields of Epigraphy, Archæology, and Sanskrit scholarship. He considered that a Sanskrit M. A. or a distinguished B. A. of the Bombay University could acquire such preliminary knowledge as was required in three, four, or five months; but that the subsequent training should be of the nature of that which an apprentice in any profession received from his master, and consequently that a Government College was not the place where it should be given. On the other hand, he expressed himself convinced that such a training could be given by the Epigraphist without devoting very much time to it, and he suggested a scheme which, he thought, would secure the result desired. He also suggested that if a separate Epigraphical Survey were established for the Bombay Presidency under Dr. Bhagvanlal, with three Sanskrit M. A.'s or distinguished B. A.'s as Assistants, not only would the work of the survey be accomplished in an exceptionally good manner, but the young Assistants would in a short time become competent Epigraphists and Antiquarians; and he recommended that the young men should be promised appointments in the Educational Department after the completion of the survey.

In forwarding these opinions to the Government of India, the Government of Bombay mentioned that one member of the Gazetteer establishment, Mr. Ratiram Dungaram, B.A., had done useful work in connection with inscriptions, and had enjoyed special opportunities under the well-known Bombay Epigraphist, Dr. Bhagvanlal Indraji; but that he was unwilling to take up epigraphical work with Mr. Fleet at the sacrifice of his prospects in the legal profession for which he was preparing.

The Government of the North-Western Provinces observed that in the Muir Central College the students looked solely to the University examinations, and expressed its fear that none of them would be willing to take up the subject of ancient Indian inscriptions. It was observed that if one or two were inclined and qualified to begin the study, there was no one in the college who could give the necessary guidance and instruction. It was added that in the recently revised Anglo-Sanskrit Department of the Benares College, there were a number of young men who were well advanced in Sanskrit and making very fair progress in English, and that a commencement would be made by encouraging some of the students to take up the study of the ancient Indian alphabets, and to advance gradually to the study of a collection of Indian inscriptions and to the decipherment and translation of the original inscriptions, by which means Mr. Fleet might in a year or so find two or three young men in the Benares College fitted for the future training he proposed to give his Assistants.

The Lieutenant-Governor of the Punjab was of opinion that Mr. Fleet's suggestions were impracticable, at any rate as regarded the Punjab, in which Province ancient inscriptions, he believed, were few in number.

Dr. E. Forchhammer, Archæologist in British Burma, observed that the history of Burma could be completely recovered from stone inscriptions written in Pali. He proposed a scheme

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for Pali studies in the Rangoon College, and proceeded as follows: "Epigraphical research, with its many collateral inquiries, necessitates, for the elucidation of the lithic records in Burma, a study of the history and graphic development of the alphabets of India, especially the branch of the Asoca alphabet, of the history of Buddhism and Brahmanism in India and ultra-India, and of the inscriptions of Java, Kambodya, and Burma, written in the Mun, Burmese, Pali, Sanskrit, and Kambodyan languages, of the history and languages of the nations and tribes from the Bay of Bengal to Thibet and the east of China. The European scholar will receive the best help from Native colleagues well trained for the work and possessing the enviable advantages of a thorough knowledge of living Native tongues and still preserved traditions. As a member of the Rangoon College staff and while travelling in the interests of Archæology, I have on many occasions observed the keen interest my pupils and other Native students took in archæological pursuits; my oldest disciple I have won entirely for that work, and he is my Assistant. I feel confident there will be no lack of material for training, and that in course of time efficient Native scholars will be gained for original epigraphical studies in Burma."

The Chief Commissioner of British Burma accepted Mr. Fleet's plan as the most practical method of training Native scholars, and promised to make arrangements, as far as possible, to carry out the scheme sketched by Dr. Forchhammer, when funds for such a purpose were available.

Mr. J. Wilson, Inspector of Schools, Assam, considered that Mr. Fleet's proposal for forming special classes at Government Colleges was a good one; but it appeared to him that the practical difficulty would be to make these classes attractive. He observed that Native youths, as a rule, look on education as a means of gaining a livelihood, and that in the shortest time possible; that most youths with good prospects of passing out well at an examination gave up their studies for some paltry employment, and thus ruined their after-career; and that the inducements offered to undertake a long and arduous course of study, so as to fit them for archæological work, must be indeed great to induce a really good youth to select this work as a means of living. Another difficulty, he observed, was that the Professor of Sanskrit in a college had already as much work as he could attend to, and that, unless relieved of some of his present duties, he would not have time to attend to a special class.

Mr. J. B. Lyall, C.S., Commissioner of Coorg (now Lieutenant-Governor of the Punjab), approved of Mr. Fleet's proposal to establish classes of selected students under Sanskrit Professors, but considered that it would be necessary to establish scholarships for the selected students and create a certain number of appointments, for which they would compete after passing through the course; without that assistance the Professors would find it impossible to get students to enter the classes and persevere in the course of study.

Mr. L. C. Rice, C.I.E., Director of Public Instruction in Mysore, expressed his opinion on Mr. Fleet's proposal as follows:

"Every one engaged in deciphering the ancient inscriptions of India, or otherwise concerned with the antiquarian records and monuments of the country, would, I feel sure, be only too glad to utilize the services of qualified Native scholars, if any such were forthcoming, for that kind of work; but my own experience, I regret to say, coincides with Mr. Fleet's in having failed to meet with any.

"Special knowledge of the kind required will always be very rare, and however desirable it may be that special knowledge of many kinds should become general, it is not in the nature of things that it should. I do not, therefore, anticipate much result from the proposal to train classes of selected students in the Government Colleges for the work now under consideration. In the first place, the Professors themselves may not have much knowledge of, or feel much interest in, the subject, and then the candidates who show most aptitude for the work will certainly find more lucrative fields of employment than Archæology is likely to offer. At the same time there is no reason why the Universities should not in their higher examinations require an acquaintance with the antique forms and characters of the Indian classical or vernacular languages in which the candidates may come up.

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"For the purpose immediately under inquiry, however, the only hope, it appears to me, lies in carefully selecting promising young men to be attached to the Archæological Survey, some of whom may in time catch the spirit of such inquiry and turn out Archæologists qualified by practice and experience."

Having collected these opinions, the Government of India came to the conclusion that the adoption of Mr. Fleet's proposal regarding the promotion of palæographic classes in Sanskrit Colleges was not practicable; that the time of the Professors was already fully occupied with their ordinary duties, while it was doubtful whether, if classes were formed, students would under present circumstances be forthcoming to attend them. It appeared, however, to the Government that there was a general agreement that the Universities might with advantage be moved to make Indian Palæography an optional subject for the higher degrees, and it intimated its desire that the Governments of Madras, Bombay, Bengal, and the Punjab should move the Universities of their respective Provinces to consider what steps should be taken for attaining this object. At the same time it was suggested (1) that a special prize of Rs. 500 should be offered by the Local Government annually at each University to the student who acquitted himself best in the subject, if he were recommended for it by the Examiners. It was anticipated that this prize would probably be supplemented by the liberality of private gentlemen interested in the subject. It was resolved (2) that an annual prize of Rs. 500 should be offered for the best collection of inscriptions, with a critical essay on them, by a *bonâ fide* graduate,

under 30 years of age; and, in order to encourage the study of Epigraphy among the Surveyors and Assistant Surveyors of the Department, sanction was given to (3) the grant of a reward of Rs. 500 to any employé of the Department who should qualify in Epigraphy within two years after the date of his appointment to the Department (Resolution No. 4—153-66, dated 11th August 1885). By a subsequent Resolution, No. 1A—17-33, dated 18th January 1886, the Governor General in Council, at the instance of Dr. Burgess, extended the benefit of the reward of Rs. 500 to any employé of the Archæological Survey who should qualify in Epigraphy at any period of his service in the Department. It was declared that the reward would be given "for a competent knowledge in any one or more of the ancient languages of India," but could not be earned more than once during service.

In a Despatch, No. 104 (Statistics and Commerce), dated 30th September 1886, the Secretary of State observed: "I consider that the suggestion contained in Lord Hartington's Despatch (of 21st September 1882, No. 146) is applicable to the Archæological Survey as a whole, and that the nature of the work makes it specially suitable for the employment of Natives. If Your Excellency agrees with this view, you may think it advisable to issue instructions accordingly to Dr. Burgess and to the local Surveyors."

These observations of the Secretary of State were communicated to Dr. Burgess, who replied as follows:

"I would venture to point out that it has been my constant practice in the surveys of Bombay and Madras to employ Native Assistants as far as practicable, and, in the Drawing Department especially, the results amply show that, with proper training, Native Draftsmen can be taught to do excellent work on very moderate salaries. Had the appointments in Northern India not been filled up before I was consulted in December last, I should have proposed that, as far as practicable, instead of European Assistants and Head Draftsmen, a larger number of Native students from the Government Schools of Art should be encouraged to enter the Survey, and be trained as Draftsmen. In translating inscriptions, I have found Native scholars like Pandit Bhagvanlal Indraji, Ph.D., most useful, and with patient training others might be taught to do very valuable work. In the Survey generally, so far as opportunities permit, I shall be most happy to continue to employ Natives wherever I can secure suitable men."

In answer to a question from the Government of India whether he had any measures to suggest for the promotion of the study of Archæology and Epigraphy by Natives of India further than those summarized in Home Department Resolution No. 4—153-66, dated 11th August 1885, Dr. Burgess adverted to a condition in the agreement with Dr. Hultzsch requiring him to do his best to train and instruct in Epigraphy the Natives and others who might be placed under him, or might be working under him, and observed that he had consulted Dr. Hultzsch on the matter, and found that if a salary, Rs. 50 or 60, were only provided for a young Native with a natural taste for Epigraphy, having some knowledge of Sanskrit, and well acquainted with at least two of the Dravidian languages, he would be glad to employ such a man as an Assistant, affording him full facilities for acquiring a larger practical knowledge. He added that he had not had the opportunity of consulting Dr. Führer, but he could hardly doubt that he also would similarly be ready to train a Native Assistant in practical Epigraphy. He expressed his opinion that the principal obstacle was the financial one, the best educated Natives expecting higher salaries; but he considered that younger men, who had not attained the highest University honors, might do well in the Department, if they had a taste for this branch of the work. He stated it was his intention to give a share of the work at his disposal to Professor Ramchandra G. Bhandarkar, M.A., Ph.D., and to Pandit Bhagvanlal Indraji, Ph.D., both of whom were highly qualified Epigraphists.

From the evidence of Dr. Hultzsch, it further appears that Dr. Burgess arranges the programme of the Epigraphist on an intelligible principle. He does not profess to exhaust the numerous inscriptions of each district in geographical order, but to collect as large a number as practicable on a tour, and to edit and publish the more important exemplars as specimens of the age and dynasty to which they belong. It is known that in the inscriptions of a dynasty the same formulæ are generally more or less adhered to in each; and when typical examples have been edited and illustrated in a scholarly fashion, they form the best of all guides for students in the translation of other epigraphs of the same dynasty. Of course the Epigraphist, when on tour, collects many inscriptions which are not of this special class, and it would be unwise to throw aside any he has copied that might be otherwise useful in any way historically, palæographically, or otherwise. Dr. Burgess also applied for the small share of the Bombay grant for Sanskrit manuscripts, which for some years previously had been placed by his own and Dr. Bühler's recommendations at the disposal of Mr. Fleet for the collection of fac-similes of inscriptions. This money he proposed to apply to the reproduction of copies of inscriptions for the use of scholars in Sanskrit Colleges, thus forestalling the idea of Professor Bhandarkar for early publication. The money, however, had been otherwise applied by the Bombay Educational Department. To secure that the translation of inscriptions shall be available for historical inquirers at the earliest moment, he sends the greater number of the fac-similes to those scholars who translate the most promptly.

Local officers are required to communicate information as to all discoveries of inscriptions directly to the Department, but they are at perfect liberty to afford the same information to any private individual or scholar if they choose. All private assistance is welcomed; but inscriptions communicated to the officers of the Department have necessarily a much better chance of ultimate publication than if sent only to an individual. Immediate publication of copies of all inscriptions would, he thinks, be a very expensive, and probably not a very fruitful, experiment.

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The Departmental Member, Dr. Burgess, in the note with which he has favored the Sub-Committee, makes the following observations respecting the qualifications required in the Department, and the capacity for employment in the Survey of Natives who have received the ordinary collegiate education available in this country: "The technical and professional requirements of the Department seem but little understood. Archæology is a science not of hypotheses, but of pure observation and logical deduction, and as such it requires special knowledge and acquirements of a high order. Some of the branches, such as Epigraphy and Numismatics, belonging partly also to history, may be pursued as separate studies, both requiring (in India) a knowledge of Sanskrit, Pali, Arabic, and other languages, as well as of Palæography and history. But for the illustration of Archæology proper or ancient monuments, which is the special field-work of an Archæological Survey, a different range of acquirements is essential, including a large knowledge of Indian architecture in its varied styles and periods, to enable the Surveyor to fix with the accuracy of an expert the age of each temple, &c., examined; also the trained judgment to select and make the drawings necessary to illustrate its characteristic points—not to multiply drawings without scientific purpose. Then a considerable acquaintance with the religions, sects, mythologies, &c., is necessary to the discrimination of the original purpose of various buildings, and also the technical knowledge to describe them accurately in the reports. From the above it will appear that two distinct classes of acquirements are necessary, but which are rarely united in the same individual, *viz.*: those of the architectural critic and surveyor and of the specialist in Oriental studies. If, however, the Orientalist can rarely be expected to possess the technical acquirements of the surveyor, the qualified architectural surveying archæologist may provide most of the materials—fac-similes of inscriptions, drawings, &c.,—on which the scholar can work almost as effectively in his study as if he had himself made them in the field. Still there are drawbacks that could only be supplied by having the qualifications combined either in one man or by two men in one survey."

"The classes that are fitted for efficient work in the upper grade of the Department are, therefore, architects and Orientalists, both with special knowledge of antiquarian research. As yet we have no Native architects with that full acquaintance with the practical details of surveying and the methods and habits of accurate delineation, and with that knowledge of the growth of Art that are essential to qualify them for Archæologists; nor have we any marked class of Epigraphists and students of the other branches. Single individuals of high merit exist, but only individuals who by bent of genius and application have acquired the necessary knowledge. A baker has become a great Botanist and Geologist, but Naturalists generally receive a special training. And since the great importance of scientific Archæology was recognized in Europe, University and other lectureships and special museums and archæological institutions at Rome and Athens have been established, to which students of high classical attainments are sent to receive instruction in Art, Architecture, Epigraphy, and the other branches of this science. In India no such means of instruction exist. As a step in this direction, the Government of India has of late offered prizes and asked the Universities to encourage the study of Epigraphy. Now it should not be forgotten that in Europe it is the young scholar, who has already taken a high place in classics, that begins to study Epigraphy and similar branches. Without the first the study of these would at best produce a pedant. So in India, without a very accurate knowledge of Sanskrit and Prakrit as a preliminary, the serious profitable study of Epigraphy is impossible. The conditions of study, too, in India differ from those in Europe. As yet the Indian student learns in order that he may get a well-paid appointment. Rarely is much time and money spent on education with a view only to the pleasures of knowledge. A Hindu who should learn Sanskrit, Pali, and Arabic with Epigraphy would in this nineteenth century demand a much higher salary in the Archæological Survey than (say) a young German Professor of even wider culture. It may be different a century hence. By all means let the study of Epigraphy be encouraged as an extra *honor* subject, and by giving the Archæological Epigraphist one or two promising young men as Apprentice Assistants. But let us beware of fostering charlatanry by supposing that under-graduates can take up the study in earnest. But when a Hindu breaks away from the ordinary course and really qualifies himself as a sound Archæologist, let him have all reasonable encouragement and employment. In the practical field work of delineation, photography, taking of fac-similes of inscriptions, &c.—when under proper instruction and supervision—I could not desire better Assistants than Native students but only then from the Schools of Art; and the Survey, by giving employment to these students, is perhaps doing a real service. They are trained in a very practical way, and in processes they do not often learn in the schools. Then from the Surveys they often get better-paid appointments, and every one who rises from the Survey stimulates the rest, and a fresh student can be drafted in. The work itself, too, is an Art education for these young men, and, in proportion to their number, this ought to have some influence on the future of Art in India."

The only witness who offered himself for examination in the Bengal Presidency was Mr. G. D. Beglar, Archæological Surveyor of Bengal. Mr. Beglar, who had qualified himself as a Civil Engineer in the Engineering College, now known as the Seebpore College, and who had been appointed an Assistant Engineer in the Public Works Department, accepted the appointment he now holds when he had attained the 1st grade of Assistant Engineers. Mr. Beglar advocated the employment as Surveyors in the Archæological Survey of Native gentlemen of high caste, and especially of Brahmans, because they can enter the most sacred recesses of the temples, and, being Natives, would take the greatest interest in the antiquities of their country; he allowed that there are no institutions in which Archæology is sufficiently taught, and that instruction must be obtained in the Department itself; and he advised the selection of Natives of the class he had mentioned from the officers of the Public Works Department

because he considered the technical knowledge which must be acquired by officers of that Department supplies a necessary groundwork for Archæological training.

The reputations of Mr. F. S. Growse, C.S., C.I.E., of Dr. Rajendralal Mittra, Bahadur, C.I.E., and of Mr. J. P. Kipling, C.I.E., are so eminent in the schools of Indian Art, that the Commission will desire to consult for itself the notes which these gentlemen have been good enough to transmit to the Sub-Committee on the subject of the present inquiry, and the Sub-Committee could do but imperfect justice to them by summarizing them. It may, however, be noted that Mr. Growse argued that the departmental system is disadvantageous to secure the results contemplated by the Government, and advocated the abolition of the Department; so as to set free funds for the engagement of specialists, for the patronage of special literary undertakings, and for the important business of monumental conservation. He was of opinion that in all the higher, or rather the purely literary, branches of Archæology, such as epigraphy, translation, and historical discussion, though Native assistance will often be of great value, the work must mainly be done by European scholars; on the other hand, he considered that architectural restorations should be conducted almost entirely through Native agency, inasmuch as the masons' guilds have a far more exact traditional knowledge than is often supposed of the different indigenous styles of earlier and later date, and, when they please, can reproduce their characteristic features with more facility and aptitude than the best-read European. At the same time, while he would minimize interference with Native workmen, he insisted that some European supervision is absolutely necessary; otherwise they are likely to exceed the limits of conservative restoration and to introduce modern improvements of their own. In addition to architects and builders, he considered that Natives are also, as a rule, to be preferred to Europeans as Archæological Draftsmen. He maintained that if they have been trained in their fathers' workshops, and not in a Government school, they have a freer touch, and, with somewhat less of a mechanical accuracy, are really more truthful in their reproduction of the *nuances* of Oriental design.

Dr. Rajendralal Mittra observed that the knowledge necessary for an Archæological officer employed to carry out the scheme proposed by Lord Canning when sanctioning the Archæological Department, includes extensive knowledge of Indian history, historical criticism and Indian classics, surveying, architecture, fine art, drawing, numismatics, photography, and epigraphy. He admitted that all these branches of knowledge cannot be readily found in perfection in any one individual, and that it would indefinitely postpone all archæological research if the Government were to wait for the discovery of such an exceptional person. He also allowed that it is unnecessary that all the different branches should be mastered to perfection before any inquiry can be undertaken; that some of the branches are of higher relative importance than others; and that in Archæology, as in other scientific inquiries, a great deal may be effected by division of labour. But after specifying the special qualities required for the different branches of archæological inquiry, he maintained that no man can be fit for archæological research who is not possessed of a high order of historical acumen, thoroughly trained by long practice, and, above all, a natural zeal for work of this kind, and a disposition of mind which takes delight in such research. He observed that work like that of the Archæological Survey can be done only once for all; and if it is not done well, it is entirely worthless;—indeed, that it is worse, for it produces an amount of error that entirely confounds history. Holding these views he advocated the utmost caution and circumspection in the selection of officers for the Archæological Department. He contended that no person should be appointed who is not fully qualified, both by training and past experience, to discharge the duties of the Department without requiring any apprenticeship, and he pointed out that, in this view, the appointments must be made by selection, and not by competition. He added that the Department is of so technical a character that the question of claims to service of particular sections of the community cannot be permitted to have any influence in connection with it.

Mr. Kipling observed that the results of archæological inquiry in India might be of the greatest value to scholars engaged in historical research, but they are worse than useless if they are not the work of men of first-rate scientific authority. He believed that, at present, no reasonable doubt exists that Western scholars are the best Archæologists, and that, to serve any useful purpose, the direction of the Indian Survey must be in their hands. Regarding Archæology in its relation to architecture, he maintained that the most valuable help that can be rendered by Natives of India is the reproduction by measured drawings of ancient monuments. He considered the *mistri* and artisan classes admirably fitted for this important work; and inasmuch as they have a natural affinity for constructive design, he thought it probable that the Indian architects of the future will come from this class. He asserted that men of these classes trained in the Schools of Art at Bombay and Lahore have done, and are now doing, excellent work, and he maintained that their employment on a more extensive scale would be of great advantage for educational and other purposes. Confirming the opinion expressed by Sir Charles Aitchison, he stated that, while in Bengal and Western India scholars of Native birth have shown themselves capable of good work in Palæography and kindred studies, there is in the Punjab a total absence of interest in the literary phase of the study of antiquities. Seeing that it is possible to inspire men belonging to the constructive race with some appreciation of the branches of old architectural forms, he thought it possible that the clerkly classes might similarly by instruction be led to take an interest in the scholarly branches of the subject. But inasmuch as this kind of study more than any other demands for its successful prosecution special tastes and distinct natural aptitudes, the present circumstances of the Punjab are, in his judgment, highly discouraging to the prospects of Achæology.

At Poona, Dr. Bhandarkar, Ph.D., C.I.E., Professor of Oriental Languages in the Deccan College, was invited by the Sub-Committee to favor them with his views respecting the Depart-

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ment. Dr. Bhandarkar referred to, and approved of, the order of Government discontinuing the employment of Mr. Fleet as Epigraphist; but though he did not object to, he did not approve of, the grant of Rs. 6,000 to Dr. Burgess to defray the cost of translating inscriptions, it being left to Dr. Burgess to select the translators. Dr. Bhandarkar considered that the Department should confine itself to securing accurate descriptions of ancient monuments and copies of inscriptions, and the publication of such descriptions and copies, and that scholars who devoted themselves to any branch of Archæology or to the antiquities of a particular district would be induced, by the desire of fame, to undertake translations, and would be in a very slight degree influenced to do so in view of a pecuniary reward. He considered that the sum of Rs. 6,000 would not go far to assist students in prosecuting their inquiries by the payment of their expenses, and he considered it objectionable that the selection of translators should be left to the Head of the Department. He complained that all the inscriptions are sent to Germany for translation.

He considered that only those Native scholars would devote themselves to Archæology who had an enthusiasm for it, and that the science could not be adopted as a remunerative profession. He was aware that the Government, in order to secure the appointment of Natives to the Department, had moved the Universities to encourage the study of Palæography and Epigraphy. He considered acquaintance with these sciences necessary for a student who was required to determine the date of an ancient inscription; but he maintained that no student under the degree of B.A. should take up these subjects, for until he had acquired a high degree of knowledge in history and philology, he could not become a qualified Epigraphist. He repeated his opinion that the action of the Government should be limited to the survey and conservation of ancient monuments, and the affording such assistance as it was in its power to do to scholars of established reputation, who desired to publish their discoveries. He objected to the order of the Government of India which directed local officers to communicate all newly-discovered inscriptions forthwith to the Director of the Archæological Survey, because it had had the effect of preventing altogether the publication of such inscriptions. He recommended that the same orders should be issued as were issued respecting inscriptions discovered by the Department, *viz.*, that they should be immediately published, so that any scholar who desired to do so might apply himself to decipher them.

The Archæological Survey in Madras consists of two branches—the Survey, which is under the direction of Mr. A. Rea, and the Epigraphical branch, which is under the direction of Dr. Hultzsch. Mr. Rea, who appeared as Departmental Member, has on his staff six Draftsmen, one Clerk, and two Peons, all of whom are described as "caste Natives."

Mr. Rea considers that, both for the survey of ancient buildings and for the work of conservation, it is necessary that the Surveyor or Reporter should be a trained architect, who is well versed in the principles which guide the development of architectural styles: that a person who does not possess this knowledge would be likely to disregard the minute details which largely assist an architect in classifying a building according to its architectural style and in assigning a date to its erection, nor could he prepare a set of drawings to show the chronological sequence or development of an architectural style; and that a similar want of knowledge might lead a restorer to destroy all in a building that was of archæological interest.

Mr. Rea observes that Natives have not as yet taken sufficient interest in architecture to visit Europe for instruction in that art, and that as it cannot be obtained in India, a trained European must, for the present, be placed in charge of each survey party, if work of any scientific value is to be accomplished, and injury to ancient monuments is to be avoided.

Mr. Rea states that the number of ancient buildings and inscriptions in Southern India which have escaped attention, even in districts in which attempts have been made to secure an enumeration of them, is very great. He deprecates the suggestion that the Surveyors should confine themselves to the tabulation and measurement of buildings, and should leave the classification and scientific description of them to *savants*. He considers that the Surveyor, if at all qualified for his work, while he is occupied in carefully observing, measuring, and delineating the details of a building, gains a truer insight into its history, and a truer appreciation of the style and period to which it belongs, than can be obtained by a mere inspection of the drawings, which, however careful and minute, cannot reproduce every detail.

He considers that the Draftsmen should always be "caste Natives," as they alone have access to the interiors of many temples; but he admits that they are unable to draw scientific deductions from the buildings they survey, and in practice he has found them fall into conspicuous errors. He observes that as Draftsmen they work well if supervised, but that without supervision they are wanting in accuracy, and are inclined to draw what they think should be found, and not what is found in the object they were required to copy. To render them efficient Draftsmen, Mr. Rea considers it necessary that they should be instructed at a school of Art in freehand, architectural, and geometrical drawing.

Mr. Natesa Sastri, who had formerly been a member of the staff, and had subsequently accepted an appointment in the Archæological Survey of Mysore, complained of the delay that had occurred in publishing inscriptions and translations collected and prepared by him, which he attributed at first to the ill-health and afterwards to the increased duties of the Head of the Department. He expressed his opinion that, having regard to the large proportion of Tamil and Telugu inscriptions in Southern India, an Epigraphist should have been appointed who had a thorough knowledge of Tamil and Telugu in all their dialectic variations, and he asserted that no one who is not a Native is competent to undertake the work. Moreover, he pointed out that only Brahmans and Sudras of the better caste are permitted to enter the most sacred chambers

in the temples where the most valuable inscriptions are to be found, and he added that these inscriptions are so often mutilated that an accurate idea of the defaced letters could be obtained only from an actual inspection. Hence he argued that only the higher caste Natives can efficiently discharge the duties of an Epigraphist in Southern India. He also complained that no system is observed in the collection of inscriptions, and that the work is carried out imperfectly, at one time at one place, and at another time at another. He urged that the results obtained should be published annually and at a price to place the publication within the means of Native scholars.

He regarded the existing staff, one Epigraphist and an Assistant, as insufficient to accomplish the work to be undertaken in Southern India within a reasonable period. He recommended the employment of two Native Epigraphists on salaries of Rs. 250—500 each, one to be employed exclusively in the Tamil and Malayalam districts, and the other in the Telugu and Kanarese districts; and of four Native Assistants to each of these Epigraphists on salaries of Rs. 50—100. If the Government considered it inexpedient that a Native should be placed at the head of the Epigraphical branch, he suggested that this branch should be placed under the supervision of the chief officer in the Architectural branch. He pronounced the pay of the Surveyor and of his Draftsmen inadequate, and recommended that the Surveyor should receive a salary of Rs. 500—800, and the Draftsmen salaries of Rs. 75—100.

Dr. Oppert, Professor of Sanskrit and Philosophy at the Presidency College and Curator of Oriental Manuscripts, considered that, with the means at its disposal, the action of Government in restricting the operations of the Department is well-advised. He bore testimony to the efficiency of the Epigraphist. He mentioned that Dr. Hultzsch had not only won honorable distinction at Vienna in Oriental languages, but had received high testimonials from well-known Sanskrit scholars, and had been specially deputed by the Prussian Government to collect inscriptions in Kashmir. He pronounced his appointment a gain to the Department. He considered that a Native scholar who had been engaged in epigraphical researches in Southern India was a man of ability, but that it would be unfair to compare him with the gentleman selected by the Secretary of State, as he had not had the same educational advantages, and did not possess the same breadth of learning. He was aware of the opinion expressed by the Secretary of State as to the desirability of the employment of Natives in this Department, and stated that he had been consulted as to the possibility of training them in Epigraphy and Palæography, and that he continued to hold the opinion he had then expressed that these subjects could not be effectively taught in colleges which prepared students only for the B.A. degree, as the aim in such institutions is to impart a general, rather than a special, education; but he thought that when classes for the M.A. were opened, they would be in a position to teach these subjects: and he mentioned that one B.A. had given notice that he would take up Epigraphy as a subject for the M.A. degree in 1888.

Dr. Hultzsch stated that he had studied Sanskrit, Arabic, and Persian at Leipsic and Bonn, and had received permission from the University of Vienna to lecture on Oriental languages. He also stated that he had studied privately the Dravidian languages before he was engaged by the Secretary of State as Epigraphist on the recommendation of Drs. Burgess and Rost and Professor Bühler; that on his engagement it had been stipulated that he should instruct Native students in Epigraphy; that a Brahman, a B.A. of the Madras University, had been allowed him as Assistant, whom he was instructing; and that he was well satisfied with the progress his pupil was making. Dr. Hultzsch expressed himself as strongly opposed to the suggestion made by Pandit Natesa Sastri that the Epigraphical work should be left wholly to Natives. He declared that he knew very few Native scholars who, like Dr. Bhagvanlal Indraji of Bombay, combine strict accuracy in details and the faculty of independent criticism, which are both essential for Epigraphists, with a thorough mastery of the Shastras. He mentioned that he had found in his office what were intended to be fac-similes and translations of inscriptions, the work of Natives employed in the Department, which illustrated the defects he had imputed to them. He admitted that, having regard to the large number of inscriptions in the Madras Presidency, it is desirable that a larger number of Native Assistants should be employed in Epigraphical work. He considered that an intelligent and well-grounded student would not require a prolonged period of training to be able to decipher the characters of the oldest Dravidian inscriptions. The qualifications requisite for a student in Epigraphy in Southern India are, he thought, a good practical grammatical knowledge of one or more of the Dravidian languages, a fair knowledge of Sanskrit, common sense, patience, accuracy, and modesty. He expressed his opinion that Native Assistants might be employed not only in collecting fac-similes, but in independently translating inscriptions of which the historical matter coincides with that of other inscriptions already carefully edited; and he explained that Dr. Burgess is anxious to obtain a collection of carefully-edited inscriptions of all the dynasties of Southern India to form, as it were, the skeleton of a political history of Southern India, and with this view directed the investigation successively of inscriptions in different districts. The course to which exception had been taken by a former witness was, he asserted, due to deliberate purpose, and not to a want of system; and when standard inscriptions had been published for every dynasty, he saw no reason why Native students should not be engaged to work up the materials in each district. He considered the salary of an Assistant, Rs. 50, sufficient as initial pay for a student who had much to learn, but that it should be increased when efficiency had been attained. He was of opinion that it is undesirable to engage officers for a short term of years if systematic work is desired, and that a sufficient number of qualified men can be found, if required, to enable the Government to form an Epigraphical Department.

Section II.—Note by Dr. J. Burgess, C.I.E., Departmental Member.

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Section II.

For the Archæological Department no formal regulations exist, and it would be impossible to state any principle that has been followed in making the appointments.

For the better understanding of the present arrangements, however, it may be of advantage to outline the history of the Department. About forty-three years ago the Court of Directors encouraged the Bombay Government to investigate the cave or rock temples of Western India and their inscriptions. The supervision was entrusted to a Commission in Bombay, and a small staff engaged to make drawings and even paintings, and to copy and translate the inscriptions. After years of labour and expense, owing to the incompetency of the staff, the results were found to be unsatisfactory, and it was given up. The late Mr. James Fergusson's publications on the Rock Temples, Picturesque Illustrations of Indian Architecture, and History of Architecture had, however, created a strong interest in the monumental archæology of India: and his genius had shown that, independently of inscriptions, the age of monuments might be fixed with remarkable accuracy from a careful study of the development of the style. About 1862 Major (now General Sir Alexander) Cunningham, of the Engineers, was employed to make an Archæological Survey in Upper India, on which he continued for some few years, and collected important historical and geographical information, but did little to illustrate the architecture and art. This survey was stopped in Lord Lawrence's time. The want of a careful survey was much felt however, and some years later Government allotted R13,000 to each of four circles for the survey of antiquities, suggesting that the Superintendents of the Schools of Art might be employed to carry it out. It was an ill-digested scheme, and could not be made to work. Lord Mayo's Government then decided to offer General Cunningham the superintendence of the Survey, and he returned to India in 1870 and directed the work in Northern India till 1885, but without any very special reference to the development of the history of art and architecture as such. In the end of 1873, I was invited to take up the survey of the monuments of Western India, and to report on their condition. The districts first assigned included the Bombay Presidency, with Sind, Berar, Hyderabad, and Central Provinces, and I was made free of all control by General Cunningham. This survey of Western India, begun in January 1874, is conducted with a small staff of one European Assistant or Surveyor trained in the Survey, and a few (six or seven) School of Art students as Draftsmen. Six quarto volumes of reports, including the separate volume on the cave temples, have been published, together with a large volume containing nearly 300 photographs and other fac-similes of inscriptions, and eleven smaller publications; one of them a list of all the principal remains in the Presidency, including Sind and Berar; and three more volumes of the reports are almost ready for the Press.

In November 1881, the survey of Southern India was added to that of Western India. The staff consists of a European trained architect as Surveyor, with six or seven School of Art students as Draftsmen, and Dr. Hultzsch as Epigrapher, with one Native Assistant.

In 1885, General Cunningham retired from the Survey of Upper India. His staff had consisted of two Assistants and I know not who else. On his retirement a new scheme was devised: his pay and allowances were divided into three, and a Surveyor, with one Assistant, one highly-paid Native Draftsman, and a clerk, were appointed for each of three circles, *viz.*—(1) Bengal, with Assam and South-Western Frontier; (2) North-Western Provinces, with Central India and Central Provinces; and (3) Punjab, with Sind and Rajputana. The organization is most unsatisfactory, and must be expensive out of all proportion to any possible results. Some modifications have already been made to obviate the manifest defects of the scheme, and others will follow as opportunity occurs.

Service in the Department counts for pension, but no separate rules for pay or furlough have been laid down. These fall under the regulations for the Educational and the other Scientific Departments.

The technical and professional requirements of the Department seem but little understood. Archæology is a science, not of hypotheses, but of pure observation and logical deduction, and as such it requires special knowledge and acquirements of a high order. Some of the branches, such as Epigraphy and Numismatics, belonging partly also to history, may be pursued as separate studies, both requiring (in India) a knowledge of Sanscrit, Pali, Arabic, and other languages, as well as of Palæography and History. But for the illustration of Archæology proper or ancient monuments, which is the special field-work of an Archæological Survey, a different range of acquirements is essential, including a large knowledge of Indian architecture in its varied styles and periods, to enable the Surveyor to fix with the accuracy of an expert, the age of each temple, &c., examined; also the trained judgment to select and make the drawings necessary to illustrate its characteristic points—not to multiply drawings without scientific purpose. Then a considerable acquaintance with the religions, sects, mythologies, &c., is necessary to the discrimination of the original purpose of various buildings, and also the special technical knowledge to describe them accurately in reports.

From the above it will appear that two distinct classes of acquirements are necessary, but which are rarely united in the same individual:—namely, those of the architectural critic and surveyor and of the specialist in Oriental studies. If, however, the Orientalist can rarely be expected to possess the technical acquirements of the Surveyor, the qualified architectural surveying archæologist may provide most of the materials—fac-similes of inscriptions, drawings, &c.,—on which the scholar can work almost

as effectively in his study as if he had himself made them in the field. Still there are drawbacks that could only be supplied by having the qualifications combined either in one man, or by two men in one survey.

The classes that are fitted for efficient work in the upper grade of the Department are, therefore, architects and Orientalists, both with special knowledge of antiquarian research. As yet we have no Native architects with that full acquaintance with the practical details of surveying and the methods and habits of accurate delineation, and with that knowledge of the growth of Art that are essential to qualify them for Archæologists; nor have we any marked class of Epigraphists and students of the other branches. Single individuals of high merit exist, but only individuals who by bent of genius and application have acquired the necessary knowledge. A baker has become a great Botanist and Geologist, but Naturalists generally receive a special training. And since the great importance of scientific Archæology was recognized in Europe, University and other lectureships in special museums and archæological institutions at Rome and Athens have been established, to which students of high classical attainments are sent to receive instruction in art, architecture, epigraphy, and the other branches of this science. In India no such means of instruction exist. As a step in this direction, the Government of India has of late offered prizes, and asked the Universities to encourage the study of Epigraphy. Now it should not be forgotten that in Europe it is the young scholar who has already taken a high place in classics that begins to study Epigraphy and similar branches. Without the first, the study of these could at best produce a pedant. So in India, without a very accurate knowledge of Sanskrit and Prakrit as a preliminary, the serious profitable study of Epigraphy is impossible. The conditions of study, too, in India differ from those in Europe. As yet the Indian student learns in order that he may get a well-paid appointment. Rarely is much time and money spent on education with a view *only* to the pleasures of knowledge. A Hindu who should learn Sanskrit, Pali, and Arabic with epigraphy would in this nineteenth century demand a much higher salary in the Archæological Survey than (say) a young German Professor of even far wider culture. It may be different a century hence. By all means let the study of Epigraphy be encouraged as an extra *honor* subject, and by giving the Archæological Epigraphist one or two promising young men as Apprentice Assistants. But let us beware of fostering charlatanry by supposing that undergraduates can take up the study in earnest. But when a Hindu breaks away from the ordinary race for money, and really qualifies himself as a sound Archæologist, let him have all reasonable encouragement and employment.

In the practical field-work of delineation, photography, taking of fac-similes of inscriptions, &c., when under proper instruction and supervision, I could not desire better assistants than Native students; but only then from the Schools of Art; and the Survey, by giving employment to these students, is perhaps doing a real service. They are trained in a very practical way, and in processes they do not often learn in the schools. Then from the Survey they often get better paid appointments, and every one who rises from the Survey stimulates the rest, and a fresh student can be drafted in. The work itself, too, is an Art education for these young men, and in proportion to their number this ought to have some influence on the future of Art in India.

The form representing the existing organization is annexed: it is, however, hardly possible to make the constitution of the Department clear in such a form. It consists of:—

1 Director-General of all the Surveys.

(*a*) In Bombay—

	Rs.	Rs.
1 Archæological Surveyor and Photographer	...	420—540
6 or 7 School of Art students as Draftsmen	...	35 to 65
1 Clerk, peons, &c.		

(*b*) Madras—

1 Archæological Surveyor	...	350—500
6 or 7 Draftsman—one of them a Photographer also	...	30 to 60
1 Clerk, peons, &c		
1 European Epigrapher for Tamil, Telugu, Sanskrit, &c.	...	400

(*c*) Bengal Circle:—

1 Eurasian Surveyor	...	625—700
1 European Assistant Surveyor	...	325—400
1 Native Draftsman	...	200—220
1 Clerk	...	50

(*d*) North-Western Provinces and Oudh Circle—

1 Surveyor (Major Keith)	...	625—700
1 Assistant Surveyor (Dr. Führer, Orientalist)	...	325—400
1 European Architectural Assistant and Head Draftsman	...	190—240
3 Native Draftsmen	...	35—50
1 Clerk	...	25—50

(*e*) Punjab Circle—

1 Surveyor	...	625—700
5 Native Draftsmen	...	35—55
1 Clerk	...	28—50

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Section II.

Existing Organisation and Constitution of the Archæological Survey Department.

Department.	1	2	NUMBER OF APPOINTMENTS IN EACH CLASS OR GRADE NOW HELD BY.						
			1	2	3	4			
						NATIVES OF INDIA.			
	Total number of gazetted appointments or of appointments not being merely clerical of a value of R100 and upwards.	Distribution of gazetted appointments and the other appointments mentioned in column 2 amongst classes and grades with rate of pay attached to each.	Europeans not domiciled in India.	Europeans domiciled in India.	Eurasians.	(a) Hindus.	(b) Mahomedans.	(c) Others.	(d) Total.
Archæological Survey.	Hardly 8 and at present 6 or 7	1 Director General, R1,500.	1						
		3 Surveyors (Bengal, N.-W. P. and Punjab), R625 to 700.	2	...	1				
		1 Archæological Surveyor and Photographer (Bombay), R450 to 540.	1						
		1 Archæological Surveyor (Madras), R350 to 500.	1						
		2 Assistant Surveyors (Bengal and N.-W. P.), R325 to 400	2						
		1 Architectural Assistant and Head Draftsman (N.-W. P.), R190 to 240.	1						
		1 Epigrapher (Madras), R400	1						
		1 Draftsman (Bengal), R180 to 220.	...	..	...	1	...	...	1
			9	...		1		...	1

Note by the Departmental Member, Madras.

The work is under the orders of Dr. Burgess, Director General of the Archæological Survey of India. Under him I am head of the working staff for conducting the work of Architectural or Archæological Survey, and reporting on the work to Government. I have a staff of a clerk, six draftsmen, one of whom is also a photographer, and two peons; all of these are caste Natives.

The Epigraphical Branch is conducted by Dr. E. Hultzsch, Ph.D., with one Native Assistant. With the exception of the sending of all inscriptions we may copy to Dr. Hultzsch for translation, the Architectural Branch necessarily works independently.

The work of this Department thus embraces these two distinct branches. As to the practical work of surveying ancient buildings, the Surveyor and Reporter must have a thorough knowledge of architectural style. If well versed in this, a trained architect can draw deductions as to age from the minutiæ of style in a building quite independently of inscriptions. All this can only be done by one who has studied as an architect, and is versed in the principles guiding the development of architectural style. There are no Natives with these qualifications, for there is no architectural school in India, and Natives have not as yet taken sufficient interest in the study to induce them to go to Europe for instruction. Until such instruction can be had in India, a trained European must be at the head of each Survey, if work of any accuracy and scientific value is to be turned out.

Another important branch is conservation or the repair of ancient works. To prevent acts of vandalism being perpetrated, a knowledge of styles is again essential, else we should have all our ancient buildings modernized or rebuilt according to the ideas of the restorer. A Curator without knowledge of architecture will do more harm than good in any attempt at restoration, and he would as likely as not destroy archæologically all buildings he touched. As this section of the work is essentially that of an architect, a Native cannot be trusted to conduct it scientifically.

To report on the above work with scientific accuracy, the qualifications mentioned are imperatively necessary. One ignorant of these may make a guess at the architectural style or particular period to which a structure may belong; but this guess will as likely as not be wrong. A person untrained in architecture generally looks at a building as a whole, and is unable to distinguish those minute variations of detail which are of the greatest importance in an accurate system of classification. An architect, on the other hand, places the first consideration on the general style and execution of the various details of a building, and is thus able from his experience to classify it according to its date and period of the style to which it may belong. This knowledge is also essential to turn out a series of drawings shewing a sequence or development of any class of art. Drawings can be produced *en masse*; but, if they are indiscriminately collected, not selected as to show the development in the style they are intended to exemplify, they are of little use for purposes of scientific Archæology.

The subordinate posts are filled, and should only be filled, by caste Natives as Draftsmen. They have access to the inner parts of temples closed to non-Hindus, but they are unable to draw scientific deductions from the style of the building being surveyed. I know of one case in which a Native, who

wishing to prove that a temple of the 6th or 7th century, now in possession of the Vaishnavas, had at the time of building been a Saivite one, pointed to some Saiva emblems on a 16th century gopura attached to the temple.

Natives as Draftsmen work well if properly supervised. Without supervision, instead of copying the work before them, they are inclined to *invent* or draw what they think should be, instead of what really is. As Draftsmen, they require special training at a School of Art in freehand, architectural, and geometrical drawing.

In all branches of Archæology, Natives, with a few exceptions, have shown great apathy in the study; they still require to be educated to it. When this apathy is overcome, and they learn to put the value on it as a science that is done in Europe, then they may expect to qualify themselves to take the higher posts in the Department. In the meantime to appoint them to these posts would be to cause irrevocable mischief and confusion, for their deductions drawn from style of buildings, &c., would in most cases be erroneous.

Lists of buildings and inscriptions were published in 1882 by Mr. Sewell from lists supplied by District Officers. Many thousands of Archæological works are thus tabulated, but in most of the districts I have visited I have almost invariably found numbers of others which have been overlooked by those supplying the tables. The numbers in the whole of the south are practically unlimited. It has been suggested to tabulate and measure each of these, then leave the reporting to some scholar who has a genius for the subject. Grave objection may be urged against this. The Surveyor, if he is at all qualified for his work, by the very fact of his becoming acquainted with the style and details of the building he surveys, naturally gains a deeper insight into its peculiarities than a person who merely superficially inspects it, or endeavours to write a report on the drawings produced by the Surveyor. Every portion and detail of a building cannot possibly be reproduced in drawings; but nevertheless to the qualified Surveyor, who is of necessity continually going over and over the various parts of the structure while he is at work on it, these portions lend their aid in leading him to a proper appreciation of the object he is studying.

The pay of the Draftsmen varies from Rs. 30 to Rs. 45, with prospects of further increase.

The travelling, leave, pension, and other rules are those of the Uncovenanted Services generally.

Six months are usually spent on field duty during the cool season; and during the remaining six the staff is engaged at head-quarters inking in the drawings previously done in the field, while the Surveyor superintendents their work and writes up his report on the work previously done.

Section III.—Sittings at Calcutta.

WITNESS No. I—*29th March 1887.*

Examination of J. D. BEGLAR, Esq., Archæological Surveyor, Bengal.

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Section III.

Mr. J. D. Beglar.

The *President.*

I received my technical education in the Civil Engineering College, Calcutta, and left that institution in 1863, when I was appointed to the Public Works Department, Bengal. I entered as Assistant Engineer, 3rd grade. Five appointments were offered by Government to those who completed their training in the College, and I received one of them. In 1871, when I was in the 1st grade, I joined the Archæological Survey Department, and I am now Archæological Surveyor of Bengal, and am examined at my own request. I wish to point out that there is a special opening for Hindu gentlemen of high caste in my Department. The work in the Archæological Survey consists of measuring temples and looking up the antiquities of the district. I think Brahmans of the Public Works Department would be suited for it, because they could enter the most sacred recesses of the temples; and, as Natives of the country, they ought to take the greatest interest in the antiquities of the country. There is a Director General of the Department of the Archæological Survey. There is a Surveyor and Assistant in Bengal, a Surveyor and Assistant in the North-Western Provinces, and a Surveyor only in the Punjab. With the exception of one, all are Europeans, and no one of them is an Engineer.

The *President*—contd.

There are no schools in which Archæology is taught in India sufficiently to qualify for the Department; the necessary education can only be obtained by service in the Department. I consider that men from the Public Works Department would possess the necessary groundwork for an Archæological training to a greater extent than other persons, as their technical instruction would come into play.

Sittings at Poona.

WITNESS No. II—*25th July 1887.*

Examination of Dr. BHANDARKAR, M.A., PH.D., H.M.R.A.S., Professor of Oriental Languages in the Deccan College.

The *President.*

Dr. R. G. Bhandarkar.

Have you been in correspondence with Dr. Burgess concerning this Department?—Not in correspondence, but last year I had a very long conversation with him about it.

Are you aware that the present policy of the Government of India is to secure an exhaustive list of such of the vestiges of antiquity as may present features of historical or other interest, to obtain accurate measurements and delineations of them, and to secure, as far as possible, the conservation of such as can be conserved, leaving it to specialists now or hereafter to deal with the archæological questions connected with these antiquities?—I was not aware that that was the intention. The last Resolution of the Government of India I have seen is the one relating to the abolition of the appointment of Epigraphist held by Mr. Fleet. I quite agree with the Government of India that there should not be such an appointment; but as regards the scheme for putting Rs. 6,000 into Dr. Burgess' hands to defray the cost of translating of inscriptions, leaving it to Dr. Burgess to choose the translators, I wish to say that I do not wish to offer any opposition to it, but that I am decidedly of opinion that this Department should confine itself to securing an accurate description of ancient monuments and to taking copies of inscriptions, a report being published from time to time with such descriptions of these monuments and copies

The *President*—contd.

The *President*—contd.

of inscriptions. That is all the Government of India need do, and the scholars, wherever they may be, who devote themselves to a particular branch of Archæology and to the antiquities of a particular district, might translate these inscriptions for themselves and publish the results of their studies, for which they would have a sufficient inducement in the fame of their discoveries, in comparison with which the sum of Rs. 6,000 would be almost as nothing.

Might not many students be assisted in prosecuting their inquiries by the payment of their expenses?—I do not think Rs. 6,000 would go very far towards that end. Another objection to its being left to a particular individual to choose whom to send inscriptions is that he may choose to employ his particular friends. All inscriptions are sent to Germany as it is. I have always thought that the Archæological Surveyors to the Government of India should confine themselves strictly to copying and publishing the inscriptions, and should leave it to scholars to do what they like with them.

Is it your opinion that only those Native gentlemen will devote themselves to Archæology who feel an enthusiasm for it?—Certainly.

It is not a profession which it will pay a man to take up?—Certainly not.

Are you aware that the Government, in its desire to find employ for Natives in this branch of the Service, addressed the Universities with a view to ascertain how far it was desirable, by including Palæography and Epigraphy in the optional subjects for a degree, to encourage the study of these sciences?—Yes.

Do you find in Sanskrit inscriptions that the characters of the alphabet vary according to the age of the inscriptions?—Yes; but hitherto we have attached too much importance to it, identifying a certain form with a certain period; and latterly some doubts have been cast upon the accuracy of our conclusions in this respect. Some ancient forms, which have generally fallen into disuse or been modified, have in some places long survived; but still it remains true that certain forms of letters belong to a certain period.

The *President*—concld.

It is still necessary that any student who has to determine the age of an ancient inscription must be sufficiently acquainted with Palæography and ancient alphabetical forms, and the changes and modifications they have undergone at certain periods?—Yes.

Is it possible at all to encourage these studies at Indian Colleges?—Not at the Colleges which teach only up to the B.A. standard; but a man who has taken the M.A. degree and has sufficient leisure might devote himself to the study of the subject. I have no objection to a University making Epigraphy an optional subject for those of its students who apply themselves to kindred branches of learning; but until a student has mastered a considerable amount of history and philology, it is not likely he will be a qualified Epigraphist. Until he has taken the B.A. degree, he should not meddle with the subject.

Then you consider that the action of the Department should be limited in the manner you have expressed?—Yes.

And that the Government should reserve what rewards it has in its power to offer to assist a scholar in publishing his works?—Yes. Any scholar of established reputation who has paid particular attention to inscriptions and wants to publish his discoveries, and asks the Government to assist him; but, with this exception, the Department should confine itself to survey and conservation.

Is there any other point on which you would like to give us the benefit of your experience?—I wish to add that I object to the order of the Government of India which requires local officers who discover inscriptions, or to whose notice inscriptions are brought, whether on stone or metal, to communicate them forthwith to the Director of Archæological Survey, because it has had, and has, the effect of preventing altogether the publication of such inscriptions. I would suggest that the policy of the Government of India in this respect should be the same as in the case of inscriptions discovered by the Department of Archæology, *i.e.*, they should be at once published so that any scholar who desired to do so might apply himself to their decipherment.

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Archæological survey.

Section III.

Dr. Bhandarkar.

Sittings at Madras.

WITNESS No. 111—*1st August 1887.*

Examination of PANDIT NATESA SASTRI.

The *President.*

Where were you educated?—At Kombakonam, and subsequently at the Presidency College. I am an F. A. I studied languages not only in the College, but under Native Munshis.

Will you kindly give us your views on the subject of the present enquiry?—Certainly (*reads*):—

The present method of conducting the Inscription Branch of the Archæological Survey can hardly on any account be called satisfactory. The tabulation of the list of places containing inscriptions began in 1881. Mr R. Sewell, of the Madras Civil Service, under whom I served, first began it.

The *President*—contd.

In 1882 Dr. Burgess took charge of the Survey and went to Rameswaram. I joined his staff in 1883, and worked under him. I was ordered to copy all the inscriptions at Tanjore. I was engaged on this work for 5 months. These I afterwards translated and gave to Dr. Burgess. The next place I worked at was Kanchi, where I copied nearly a thousand inscriptions, part of which I translated, while a great part remains untranslated. I also went through the several villages of Kanchi and Madurantakam Taluks in the Chingleput District, and copied a large number of inscriptions. Every day I went on copying and translating, and every day the number of manuscripts swelled, but not one page even of them ever saw the

Pandit Natesa Sastri.

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Section III.

Pandit Natana Sastri.

The *President*—contd.

light of day in the shape of printed matter. I attributed the delay originally to the weak eye-sight of Dr. Burgess, and his consequent inability to pass the papers through the Press. After he was restored to health, the duties of the Directorship of the Archæological Survey of the whole of India devolved upon him. Owing to this increased work, and the peculiar arrangement by which he was to remain only 6 months of the year in India during the winter season, that is, at a time when little out-door work could be done, and owing to the circuits he had to make from the Himalayas to Cape Comorin in the course of superintending the five divisions working under him in the several parts of India, he was able to give very little time to the inscriptions of Southern India, his aggregate stay in this Presidency being on an average less than a month a year.

Thus the work of inscriptions of Southern India under the Archæological Survey Department fell into a most unsatisfactory state. During the last 4 or 5 years only one brochure, called "Notes on Inscriptions in the Madura District," has been published, though several hundreds of very important inscriptions have been copied and translated. Eventually the Government appointed a German scholar, Dr. Hultzsch, to the Inscription Branch of the Archæological Survey. Ever since I left the Survey, and till the arrival of Dr. Hultzsch in December last, *i.e.*, for nearly 10 months, the inscription work stood still. Dr. Hultzsch joined the Madras Survey in December last. Meanwhile I had taken up a special appointment on Rs. 100 per month for 6 months in the Maisur Archæological Survey.

I have seen several contributions from Dr. Hultzsch's pen on Sanskrit grants, and he is doubtless a good Sanskrit scholar. But it is not Sanskrit or Pali scholarship that is essential to a correct reading and translation of South Indian inscriptions. Sanskrit inscriptions in the Madras Presidency are very few, not more than one in a thousand. To appoint, therefore, a person who has not a thorough knowledge of the vernacular seems an error. A knowledge of Tamil and Telugu in all their dialectical variations, in their correct and colloquial forms, as spoken by different varieties of people, is essential. Whatever may be the Dravidian scholarship of an European, he cannot possibly have acquired in Europe, nor has he the time and opportunities of acquiring in India, a knowledge of these languages in all their varieties, ancient, modern, and colloquial.

Without meaning any disparagement to Dr. Hultzsch, I can say with confidence—a confidence acquired and strengthened not alone by my intimate acquaintance with the nature of this work in which I have spent five (pecuniarly to me fruitless) years, but my acquaintance with the European so-called Dravidian scholars—that a Native scholar is alone competent for this work. I am aware it will be said that a European is required to bring to bear, on the facts collected, his faculty of generalization; but even granting that this generalizing faculty must come from the European alone, it must be admitted that a generalization to be of any value must be based on solid facts. Facts must be first collected patiently and intelligently, and for this I should prefer one who has too little rather than too much of this generalizing faculty. Further, even if the European has all

The *President*—contd.

the Dravidian scholarship of a Kamban, he can do no independent work with the ancient inscriptions of South India. As a European he cannot enter the inner parts of a temple in which worship is performed, and where alone the most valuable of the ancient inscriptions are to be found. The only exception to this is the Tanjore temple, where Europeans have been allowed to go round the Garbhagriha (*sanctum sanctorum*) and a few ruined temples. But there are hundreds and thousands of temples in South India with an humble exterior, but a rich interior. A European can go only up to the flag tree—the outermost part of a temple. So his scholarship, even though it were of the best sort, is of no avail as long as he cannot personally examine the inscriptions.

Natives alone can go into the inner parts of a Hindu temple; and the higher the caste, the more is the privilege enjoyed. The highest caste Brahmans have the privilege of entering every part of the temple. So Brahmans and higher caste Sudras alone are the proper persons to conduct researches in inscriptions in Southern India; and there by the privilege of their caste can also enter into conversation freely with all the people of any place they visit, and especially with the priests and guardians of temple secrets. It may be said that an European who may be thoroughly versed in the languages can read the inscriptions from the fac-similes made by a Brahman assistant, but in many cases, in fact in the majority of cases, the letters are so broken that though they can easily be read on the stone, it is impossible to decipher them on the fac-simile from the fact of the letters not showing clearly. In a place like Kanchi, containing nearly a thousand inscriptions, if all the stones are to be impressed, we should have to spend some years for doing that temple alone. As our first aim should be to have an accurate copy of all available inscriptions, and as the oldest inscriptions are always found more and more inside the temple than outside, the Brahmans and higher caste Sudras, who alone by the privileges still granted to them can enter every part of the temple, must be placed at the head of this work.

For real, useful, practical work an Epigraphist should, I think, be sought on the banks of the Kaveri or Krishna rather than the Danube. Should Government consider it inexpedient to place a Native at the head of a Department, this branch may be put under the supervision of the Architectural Branch of Archæology, which has an European head.

I would here also point out that the inspection work has been till now proceeding without system. The inscriptions in Tanjore temple alone were first copied; then the inscriptions at Kanchi and the adjacent places, and then a few villages here and there, and so on. This sort of flying work from place to place must be put a stop to. Inscriptions in and round about an ancient division of South India must be thoroughly examined before any place in the next division is taken up. Then alone will it be possible to arrive at a generalization touching the country investigated. To work for a few months at Tanjore, a year at Kanchi, a week at Tirupati, and so on, is not at all the right way of going to work.

The *President*—contd.

Lastly, I would suggest that every portion of the work done during the year must be invariably printed and priced cheap, so as to be within the reach of every one. The remark made by Mr. Growse, of the Bengal Civil Service, of the prohibitory prices charged for Archæological publications applies equally to Southern India. Books, which the dearest bookseller in Madras would sell for a couple of rupees, are sold for Rs. 10 and 8 by the Government. This is not at all the way to create in the people a taste for Archæology.

Before concluding, I should like to speak a little about the staff of the Archæological Survey. The Inscription Branch has for its present head Dr. Hultzsch, and he has a clerk under him; and to these two the decipherment, collection, translation, and publication of all the inscriptions in the whole of South India is left—a task which would occupy these, if they work steadily, a hundred years, at the rate of between 4 and 5 years on an average for every district.

I would suggest that two Native Epigraphists be nominated for the inscription work, each on a pay of Rs. 250 per mensem rising by annual increments of Rs. 50 to Rs. 500, with the same liberal allowances for travelling, &c., which are granted in other Departments where the officers have to be constantly on circuit. One of these exclusively for the Tamil and Malayalam country, and the other for the Telugu and Kanarese country. Each of these is to have at least four well-paid assistants under him to impress, copy, and translate inscriptions. The Epigraphist must control all their work, and examine every portion before it is sent to the Press. Six full months must be spent in the field, and six at head-quarters. The Assistant's pay should range between Rs. 50 and Rs. 100; all appointments should be pensionable.

The Architectural Branch of the staff is composed for the present of an European Assistant on Rs. 375 rising to Rs. 500; six Draftsmen, and a clerk. The scale of pay is not at all attractive. Rs. 375 is not adequate pay to an artist and architect of Mr. Rea's standard. And the Native Draftsmen, who are all excellent free-hand drawers, get almost a coolly's pay of a rupee or a rupee-and-a-half per day a head. To induce these members to remain in the Department, a system of graded pay must be introduced. The European Assistant must be given at least Rs. 500 to begin with, and an annual increment of Rs. 50 rising to Rs. 800. And the Draftsman's pay should be between Rs. 75 and Rs. 100, and nothing less; and all these must be given liberal allowances. No really good Native Draftsman or Assistant could be procured for less than Rs. 100, and no able Epigraphists trained in English and the Dravidian languages for less than Rs. 250. If less money is paid, we can get only sham workers.

What works on the ancient forms of Sanskrit and Dravidian languages have you studied?—I have studied a considerable portion of the ancient literature in Sanskrit and Tamil.

Have you studied any works on the grammar of these languages?—Yes.

What works, European or Indian, on the ancient literature of the Sanskrit or Dravidian languages have you studied?—Professor Bhandarkar's grammar and Dr. Kielhorn's grammar, and also Weber's Sanskrit Literature.

The *President*—contd.

What Dravidian writer?—The Tamil grammar Nannul. These are works on the structure of the language. I have also studied a great deal of their literature.

Have you published yourself any Sanskrit or Dravidian works?—I have contributed several articles on Sanskrit and Tamil inscriptions to the *Indian Antiquary*.

Have you published any work that has had any circulation amongst European scholars?—Until I entered the Archæological Department, I was not in a position to write on Archæology, and what works I published subsequently were published by the Government.

You received a course of instruction from Dr. Oppert?—Yes, when I was in the College.

How was it you did not go on to take the B.A. degree?—I went up for it and failed in logic; and as I had a taste for these languages, and the Archæological Survey had just been started, I was recommended to the Department by Dr. Oppert, and then I had no time to go up for my B. A.

You complain that notes made by you were not published?—Yes.

When did you make those notes?—I entered the regular Department under Dr. Burgess in 1883, and ever since, and until I left, I was making those notes. I had been for a long time previously working under Mr. Sewell, and what work I did then I gave to the Archæological Survey. There are translations of several copper-plate inscriptions in the British Museum which were made by me.

You worked on in the Department from 1883 to 1886?—Yes.

Did you make any copies of inscriptions and notes for the Department?—Yes; translations and notes.

Was Mr. Fleet, of the Bombay Civil Service, appointed Epigraphist?—Yes, in 1884 and until 1886.

Was not Mr. Hultzsch appointed in his place?—I do not know that.

Do you know that Mr. Fleet was appointed Epigraphist to the Government of India?—I know that, but I thought that his duties did not extend to Southern India.

Were your translations and inscriptions sent to Mr. Fleet?—Not while I was in the Department.

Were you still engaged in the translations when you left this Department?—I had finished one portion, the Tanjore inscriptions. They were not sent. I had finished them by the end of 1883.

Do you read German and French?—No; only English.

You suggest that Native Epigraphists should be selected for inscription work. Whom would you engage for such work?—Intelligent Graduates of the Madras University.

Have they ever studied Palæography?—It is a study which could be easily mastered in one year. I acquired sufficient knowledge of it in one year myself.

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The *President*—contd.

In what languages?—Tamil and Telugu.

Would you have any occasion to study cognate languages?—Only Malayalam and Kanarese; no others would be required.

Can you give me the name of any work on Palæography of European reputation published by a Native scholar within the last seventy years?—This is quite a new department in Southern India, and up till now no book on Palæography has been published by a Native scholar.

How do you account for that if the science can be so easily acquired?—Natives have not given their attention to the subject, but now that the University has founded a branch of Archæology, several Native scholars may be expected to do so.

All that the University has done is to make it a voluntary subject for the M. A. degree?—Yes.

And you think that that will be sufficient to encourage the study?—Yes.

You say most of these ancient inscriptions are inside temples?—Yes.

Are not the more ancient inscriptions found where access to them can be obtained by any one?—Never, unless they are found on ruined temples or the enclosures of such temples.

Can you give me any instance of a temple in which worship is still carried on, whose antiquity is greater than six centuries?—There are many. All the Chola temples, for instance. There are twenty-four temples in Conjiveram in which worship is still carried on.

What is the age of these temples?—They date from 1024 and 1026. There are the Kombakonam and Trichinopoly temples. Mr. Sewell's tabulated list will show.

Are there any a thousand years old?—About half-a-dozen.

In which worship is still performed?—No, only in one, the cave temple at Tirupavankundram, 4 miles from Madura.

The *President*—concld.

Did you assist Mr. Sewell in making his list?—Yes.

Did you take any inscriptions for him?—No. I assisted in tabulating only.

Have you read any of Dr. Pope's works?—Yes.

He is a great Dravidian scholar?—Yes.

Mr. *Ramaswami Mudaliyar.*

Did you know the Revd. Dr. Bower?—I have read his works.

How many vernacular languages did you know when you were appointed to the Department?—Tamil, Telugu, and Hindustani. I learned Kanarese and Marathi afterwards.

The *President.*

Can you tell me how many Graduates have a thorough knowledge of Sanskrit?—There are several.

By Palæography do you mean an acquaintance with the ancient grammatical structure of languages, or with the ancient variations of alphabetical characters, the use of books according to the variations of grammatical structure of these languages, or merely the variations of their alphabetical character?—The variations of their alphabetical characters.

And you referred only to that when you said the science could be acquired in a year?—Yes.

By Palæography you do not mean, of course, the ability to discover from the grammatical structure of the language in which a book is written the age of that book?—That knowledge also could be readily acquired within a year by a student acquainted with the languages.

I suppose nobody has yet been able to lay down any precise test for deciding the period at which a Tamil work, for instance, was written. Are there not many books in Tamil which have not been published?—There may be.

Have you anything further to say?—No.

WITNESS No. IV—*2nd August 1857.*

Examination of DR. OPPERT, M.A., PH.D., of Prussia, Professor of Sanskrit and Comparative Philology at the Presidency College, Curator of the Government Oriental Manuscript Library, and Telugu Translator to Government.

Dr. Oppert.

The *President.*

I believe this Department at present confines its operations to making an accurate catalogue of historical monuments, to the noting of their dimensions and details, to the conserving, as far as possible, such as can be conserved, and to the obtaining of accurate copies of inscriptions?—Yes.

It is required to submit such inscriptions to Epigraphists of established reputation, and to scholars or others who may have devoted themselves to Archæology?—Yes.

Is that the best system that could be pursued?—It is the only one possible, having regard to the fact that there is only one Epigraphist for the whole of this Presidency, who naturally cannot be

The *President*—contd.

in more than one place at the same time, and is moreover under the orders of the Head of the Department.

Under the former system, I believe, Assistants in the Archæological Survey were encouraged to place on record their own conclusions. Did that system give satisfaction in this part of India?—No, and I believe that was the reason why they had recourse to the Epigraphist as the proper person to read and decipher these inscriptions. We have in Dr. Hultzsch, whom I know personally, an experienced Epigraphist. The present system is the best that can be devised at present, especially if you could employ more men with the requisite qualifications; but there are not many Epigraphists in England or Germany who have

The *President*—contd.

devoted themselves to the study of Indian inscriptions.

Can you tell me what qualifications Dr. Hultzsch had for the Department?—He is Doctor of Philosophy and took a very high degree in Vienna, though he comes from Dresden. Before he came out to India, he had published several Sanskrit works, and acquired the reputation of a good and careful Sanskrit scholar.

Does he know anything of Dravidian languages?—I had some opportunity of ascertaining this when, about a fortnight ago, I was living with him for several days, and I may tell you that I was much astonished at the diligence which he displayed from morning till evening in deciphering most difficult inscriptions. It was not quite my subject, but we worked at it together, and he finished the greater part of a number of inscriptions taken by him from the Seven Pagodas at Arcot and other places.

Do you think the employment of Dr. Hultzsch has been a gain to the Department?—I think so. He is a very good scholar, and no doubt if he had a little more leisure, he would become even more expert in his own subject. I have a very high opinion of Dr. Hultzsch.

Do you know Mr.———?—Yes.

He is a young man who has shown considerable diligence in Oriental studies?—Yes.

Would it be fair to compare his qualifications to those of Dr. Hultzsch?—It would not be fair to Dr. Hultzsch.

Are they at all on the same level in point of attainments?—They have a totally different standing; the one is a thoroughly trained scholar, who, owing to his training, will be able to apply himself in future to any language he may devote himself to; the other is a man of mental capacity no doubt, but, if I may be allowed to say so, not well-grounded.

Mr. ———has the advantage of being a Native of the country with a fair knowledge of Tamil. Dr. Hultzsch, on the other hand, comes from Europe. I have seen some of Mr. ———'s works, and they do not appear to me to display great accuracy. A colloquial knowledge of a language is no doubt very useful, but it does not assist much in the work of Epigraphy. I may perhaps point out that the Egyptian hieroglyphics, the Assyrian cuneiform inscriptions, the Mexican antiquities, and other vernacular writings were deciphered, though the decipherers did not even know the right pronunciation of the inscriptions they translated.

Has he prosecuted Oriental studies to anything like the same extent as Dr. Hultzsch?—I do not know. A European has the advantage of being thoroughly trained in classical languages and philology generally, and Mr.———,who is no doubt a man of great ability, would perhaps, if he had undergone the same training, have become equally competent as a scholar; but I do not see how he would get the same training in this country. I know that Dr. Hultzsch received

The *President*—concld.

high testimonials from men who were entirely competent to give them, as far as Sanskrit was concerned. Dr Bühler was one of them. Moreover, Dr. Hultzsch was sent by the Academy of Sciences of Prussia to Kashmir to collect manuscripts there; and as the Prussian Government is, as a rule, not very liberal in undertakings of this kind, it may be assumed that Dr. Hultzsch was regarded at home as a man of sufficient qualifications. I do not believe that there are many scholars at home who are competent to judge of the qualifications of a person so far as Dravidian languages are concerned, and I do not think that too much importance should be given to the testimonials. Dr. Hultzsch is quite able to qualify himself in the vernaculars of this country, and has already acquired a fair knowledge of Tamil.

Mr. *White*.

Would Dr. Hultzsch be able to get admission into temples in which worship is still carried on?—No; but the greater number of such temples are comparatively modern buildings.

The *President*.

Are you aware that the Secretary of State has expressed a strong opinion as to the desirability of employing Natives in this Department?—Yes; and I think it is very desirable.

And that in consequence of the Secretary of State's Despatch, the Government of India circulated enquiries among the different educational bodies of the country as to the possibility of educating and training Natives for Epigraphy and Palæography?—Yes.

You were yourself consulted on the subject?—Yes.

Do you still remain of the opinion you then expressed?—Yes Epigraphy is a special subject, which could only be taught specially; and our Colleges are as yet institutions which give a general rather than a special training. To a certain extent in the course of lectures in history for the B. A. degree students in the Madras University receive a practical training in Epigraphy. You might call it a general introduction to the subject. We have as yet no lectures for the M. A.

Are any students to your knowledge making a special study of Epigraphy?—Candidates who have taken their B. A. in history are likely perhaps to go on with the subject, especially those who have undertaken Sanskrit. I know at this moment that a young B. A has applied to appear at the examination in 1888 in the Epigraphical Branch.

Dr. Bhandarkar complains that the Department's publications are not made with sufficient celerity?—I believe the reason is that these publications are printed at the Government Press, and I know that, as regards Tamil inscriptions, they have to be reprinted in Tamil characters.

At the present moment Dr. Burgess has the power of sending any inscriptions to any scholars he likes. Dr. Bhandarkar suggests that all inscriptions should be published for the use of scholars generally?—Yes. The mere printing of

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inscriptions, especially if they are written in the languages of Southern India, will be of no great use to scholars outside this Presidency without a translation But above everything accuracy is required, and this cannot be secured unless the inscriptions are carefully studied, and this requires time. Carelessly printed inscriptions are of no use at all.

The *President*—concld.

If classes are sanctioned for students for the M. A. degree, would you then be in a position to give the necessary preliminary historical and epigraphical education which is required for efficient service in this Department?—I believe that with an opportunity for proper preparation I should be in a position to do so.

WITNESS No. V—*16th May 1887.*

Dr. Hultzsch.

Examination of Dr. E. HULTZSCH, Doctor of Philosophy, Leipsic, and Licensed Lecturer in Oriental Languages, Vienna.

The *President.*

I studied Oriental languages at Leipsic and Bonn—that is to say, Sanskrit, Arabic, and Persian.

Had you any knowledge of Dravidian languages before you came to this country?—Yes; I learned them privately.

Can you tell us on whose recommendation your name was placed before the Secretary of State?—Dr. Burgess, Professor Bühler, and Dr. R. Rost.

You were engaged by the Secretary of State?—Yes.

Was any condition attached in your engagement that you should instruct Native students in Epigraphy?—Yes. It was in the agreement that I should train Natives for Epigraphy. I came to India on the 21st November last year, and was ordered to take up my duties in Southern India.

Have you had Native Assistants sent to you for instruction?—Yes; since May last I have had one. He is a B. A. of the Madras University, Mr. V. Venkayya. The optional language was Tamil; he is a good Tamil student, and I am thoroughly well satisfied with the progress he is making.

Has he sufficient general education to be likely to make a good Epigraphist?—He does very well as an Assistant. Whether he would do as an Epigraphist I am unable as yet to say.

Has he any extensive knowledge of ancient history?—He is acquainted with it to a certain extent.

Do you wish to make any observation on the constitution of the Department?—I have written a short note which I will ask permission to read (*reads*):—

The gist of Mr. Natesa Sastri's evidence is that a European is not able to publish South Indian inscriptions owing to the defectiveness of his practical knowledge of the Dravidian languages, and that he is also unable to copy many inscriptions personally, as he is not allowed to enter the inner part of those temples at which worship is still carried on. Hence, instead of going to the banks of the Danube for picking up an Epigraphist, the banks of the Kaveri or Krishna are to be searched for the right kind of man; and he recommends that two well-paid Native Epigraphists, with at least four Assistants each, should be employed, who might be put under the supervision of the European head of the Architectural Branch of the Archæological Department.

The *President*—contd.

I may state that a considerable number of Tamil inscriptions are ready for publication at my office, and will be made over to the Director General on his return to India before October 1887. The fac-similes were collected during the last cold season in the North Arcot district and at the Seven Pagodas, and were, with very few exceptions, prepared, or at least finished, by my own hands; in a few cases I was prohibited from going near the inscriptions, which were then done by my peon, who is a Sûdra. Since May I have a Brahman assistant, who will be allowed to enter any temple to which access might be refused to me or even to my peon.

At the risk of being accused of speaking *pro domo*, I must strongly deprecate the suggestion to leave the Epigraphical work wholly to Natives. I know very few Native Epigraphists who, like Dr. Bhagvanlal Indraji of Bombay, combine strict accuracy in details and the faculty of independent criticism, which are both indispensable for Epigraphical work, with a thorough mastery of their Sastras.

As an instance of Native inaccuracy, I may mention the transcript and translation of an inscription which runs round a building at Conjiveram, the inscription of Mahendra, son of Rajasimha. A Native scholar undertook to copy and translate it. His text and translation began with the second-half of a verse and ended with the first-half of the same verse, while the real commencement of the inscription is found in the middle of his text and translation. I have in my office many fac-similes of inscriptions, transcripts, and translations made by Natives. Having had some practice in copying inscriptions on stone, I am able to say that these fac-similes are unsatisfactory dauba made by untrained and ignorant persons, while the translations are in part made from these imperfect fac-similes, are made carelessly, and are insufficient for historical purposes. Not only are single letters constantly misread, but the text of whole lines owes its origin, not to the author of the inscription, but to the brain of the decipherer. Considering the large number of inscriptions scattered all over the Madras Presidency, I think it very advisable to employ more Native Assistants for Epigraphical work. It is not necessary that they should undergo special training for such an appointment. To an intelligent and well-educated man, who knows the modern South Indian alphabets, the mere characters of even the oldest Dravidian inscriptions present very little difficulty. My present Assistant, Mr. V. Venkayya, B.A., is now, after three months' practice, able to read any Tamil inscription.

The *President*—concld.

After three months' practice the only requirements for a Native Assistant are a good practical and grammatical knowledge of one or more Dravidian languages and of English, a fair knowledge of Sanskrit, and, above all, common sense, patience, accuracy, and entire absence of a belief in his own infallibility. Besides, for the work of collecting fac-similes, the Native Assistants might also be employed for independently working up those inscriptions, the historical part of which coincides with other inscriptions which have already been reliably edited. What is wanted first is a collection of carefully edited samples, of inscriptions of all Southern dynasties, which will form the skeleton of a sketch of the political history of the country. This is the reason why Dr. Burgess thinks it advisable to take up as many different districts as possible one after another. When a few standard inscriptions have been satisfactorily published for every dynasty, Native Assistants might be engaged in working up the materials of single districts. After some experience, they will have no difficulty in selecting important inscriptions for publication, and in leaving worthless ones aside. Considering that the Native Assistants have to learn much at first, a salary of Rs. 50 to commence with seems sufficient. This might, however, be raised after some months' practice, as they cannot be expected to do scientific work on a clerk's or draftsman's pay.

Mr. *Ramaswami Mudaliyar*.

What Dravidian language have you studied?—I studied the elements of Telugu, Tamil, and Kanarese in Europe, and I have now sufficient knowledge of Tamil to be able to translate inscriptions with the help of my Assistant. I cannot say that I know Tamil to the extent that a Native knows it; but I think that is not the question; the question is whether the inscriptions are properly translated.

You mean that it is not enough that man is a Tamil scholar, but he must know how to set about his work as an Epigraphist?—Yes.

But the first requisite is that he should be a Tamil scholar?—A European in this country must of course have Native assistance on a work of that kind.

Mr. Ramaswami Mudaliyar—contd.

How long have you been studying these Dravidian languages?—I began them two years ago.

Have you read any of the more ancient literature of any of these languages?—I am reading old Tamil now as far as I think necessary for the study of inscriptions. I have not taken up Telugu and Kanarese yet, because I have only Tamil inscriptions to translate; but when I have to translate Telugu and Kanarese inscriptions, I shall work up those languages in the same way.

Is it not the case that most of the inscriptions in this country are in Telugu, Tamil, and Kanarese?—Yes.

There are very few in Sanskrit and Pali?—Yes.

The *President*.

Can you tell me whether the inscriptions copied by Mr. Natesa Sastri were sent to Mr. Fleet?—I think they were all made over to Dr. Burgess. I have got them now. I cannot say whether they were ever sent to Mr. Fleet.

You know Dr. Bhandarkar?—Yes; I know him personally.

Dr. Bhandarkar suggests that it is desirable inscriptions should be published as soon as possible, so that scholars in general may have an opportunity of considering them?—I think it would be a good thing if during the hot season the materials collected during the cold months were published.

Do you think it desirable for the Government to engage officers for scientific inquiries for short terms of years or to enrol them in a Department?—I think it is necessary, if anything systematic is to be done, to employ the same man for as long a time as possible.

Do you think that at any time we should be able to obtain the services of a sufficient number of qualified men to undertake work of this kind?—Yes.

You yourself are under engagement for three years?—Yes.

You think it would be better to engage men for longer periods?—I think so.

Section IV—Written Evidence.

No. 1—F. S. GROWSE, Esq., M.A., C.S., C.I.E., Collector of Farukhabad.

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Section IV.

F. S. Growse, Esq.

I have the honor to submit a brief expression of my opinions on the subject of Indian Archæology.

In this extremely over-governed country, I cannot think that scholarly research is likely to be benefited by any further extension of the departmental system. All individual effort is already well-nigh crushed by the dead weight of routine and the intolerable burden of tabular statements and periodical returns. The great want of the present day is not an additional State Department, for there are already far too many in existence, but additional State aid to private enterprize. Though a reward in one form or another is seldom eventually withheld from a good workman, it is not for immediate reward that the best work is done. All the most distinguished successes in the field of Indian Archæology have been won by amateurs—men like Sir William Jones, Prinsep, Wilson, Muir, and Hodgson, who in their public capacity were salaried servants of Government, but as Orientalists were independent and unpaid. The same may also be said of * * * , who made his mark many years ago, when Archæology was only the recreation of his leisure hours, and not his profession. During his long period of office as Director General, he effected nothing worthy of his reputation. The only volumes of his survey that do him any credit are the two first, which were compiled before his appointment. Of the twenty volumes that followed in successive years down to 1885, even those for which he is personally responsible are so utterly deficient in method as to be almost useless for purposes of reference; while the unrevised lucubrations of his Assistants are a tissue of trivial narrative and the crudest theories, in which, to borrow the language of a French savant, "le manque de critique et de sens historique dépasse en effet toutes les limites permises." However, in spite of these sadly inadequate results, I greatly admire the enlightened liberality of the Government in creating a lucrative appointment for the benefit of a distinguished specialist and as an endowment for research. I only regret that it was invested with a departmental character, and clogged with the condition, expressed or understood, that a formal report of operations should be annually forthcoming. Regarded as a reward for past services, or as an inducement to stay on in the country and prosecute further enquiries, the honor could not have been more appropriately bestowed; all that is required for its full justification is the appearance of a volume of comprehensive aim and permanent interest, elaborated in the leisure of retirement, and fitly crowning the labours and studies of a lifetime; and for this there is yet room to hope.

At present the only tangible outcome of a Department which was in existence for sixteen years is an undigested mass of raw material huddled together in twenty-two volumes. This requires to be carefully examined by a competent Archæologist, who by a judicious excision of repetitions and unsubstantiated hypotheses and other superfluities might reduce the series to less than half its bulk. The residuum would then be systematically arranged according to districts, with subordinate headings in alphabetical order, and the whole supplied with an index. The result would be a valuable and a handy compendium of all available information up to date, and would be a satisfactory basis on which to conduct further enquiries. In my opinion this is the work which most urgently presses for immediate execution. The Editor's task would be a laborious and comparatively a thankless one; but I believe it has been voluntarily undertaken by Mr. Vincent Smith of Basti, who thus shows himself a worthy successor of the earlier generation of Indian Archæologists. Had he not thrown himself into the breach, the duty might suitably have devolved upon the Curator of the Lucknow Museum, who enjoys the advantage of having an extensive library at his command.

As General Cunningham's appointment had been prompted by purely personal considerations, the Department on his retirement naturally fell to pieces. It has now been provisionally re-established in a very haphazard fashion. No one, I believe, is more sensible than Dr. Burgess himself that it is quite impossible for any one man, especially as he spends only half the year in the country, to exercise efficient control over Archæological operations simultaneously in progress in all parts of India. Any interference with the local Surveyors in these Provinces must be as unsatisfactory to himself as it is embarrassing to them. His own special charge, Bombay, is quite enough to find him full occupation, though I am not very accurately informed as to the amount of work that he has already accomplished there, or that yet remains to be done. His official publications are quoted at prohibitory prices, and apparently are not very widely distributed by the Bombay Government, as no copy has ever reached me, though the number of persons who take a genuine interest in Indian Archæology must be extremely limited, and the entry of their names in a free list would not involve a ruinous outlay.

As regards Upper India, I have no hesitation in saying that the only appointment which it was essential to continue was that of Epigraphist, in which Mr. Fleet was doing such good service. Unfortunately he was the very first victim selected for sacrifice, not from any distrust of his ability or dissatisfaction with his performance, but simply on the financial ground that, as a Covenanted Civilian of a Collector's standing, he was entitled to a higher rate of pay than the Government was disposed to sanction for this particular kind of work. But it is really far more economical to entertain an individual specialist, even on his own terms, for a limited period than it is to organize and maintain a permanent Department, while there is no comparison between the results obtained by the two methods. In every sphere of administration, the only natural outcome of departmentalism is monotonous and mechanical mediocrity, which is a continuous drain upon resource without-

ever approaching a definite consummation. Take, for example, the series of District Gazetteers. These were compiled in a specially constituted office, and on strictly departmental principles. The writers for the most part had no marked vocation for the particular kind of literary work, and had no personal interest in the localities they undertook to describe; the considerations by which they were inspired were of an entirely different character. The general statistics, being merely abstracts from Settlement Reports and Census Returns and other official records, might be as satisfactorily done in the hills as in the plains, and by a stranger as correctly as by the oldest resident. But the purely topographical portion of each volume has necessarily proved a complete failure. Every sentence betrays a misapprehension of the environment and an absence of all proper local colouring. The information had been derived through the regular official channel—that is to say, by a reference to the Collector, who called for a report from the Tahsildar, and he again from the Patwari. The latter's statement, being ordinarily expressed in Hindi, was first transmuted into conventional Urdu before transmission to district head-quarters. There it was again hastily translated, with many curtailments, into Babu English, and so passed on to the Assistant Gazetteerist. He incorporated it with some improvements in his general narrative, and finally submitted it to his chief, who, if at all proud of his own literary style, polished up the uncouth sentences into rounded and featureless ambiguity. Even if the facts had been correctly represented in the first instance, they could scarcely escape a large amount of distortion during the lengthy process to which they were subjected before their appearance in print.

However ludicrously untrustworthy as results thus obtained must be, it is the only mode of enquiry that is departmentally recognized. Within the current month I have received two official circulars—one from the Commissioner, the other from the Curator of the Lucknow Museum—asking me to call upon Tahsildars for carefully revised reports and tabular statements on matters of archæological and historical interest. Apparently it is not understood that a subordinate revenue official may be expected to frame a fair forecast as to the agricultural prospects of the seasons, but it is scarcely in his line to decipher a Gupta inscription, or determine the date of a ruined temple, or explain the subject of a Buddhist sculpture. On all such matters a specialist only can pronounce, and, if correct information is desired, Government must for once abandon its favorite routine and set specialists to work; not encumbering them with all the costly paraphernalia that delight the heart of an Accountant General, but leaving them at liberty to make their own arrangements in their own way, with a reasonable subordination of means to end.

In all the higher, or rather the more purely literary, branches of Archæology, such as Epigraphy, translation, and historical discussion, though Native assistance will often be of great value, the work must mainly be done by European scholars. The most conspicuous intellectual defect of the Oriental mind is its habitude of inaccuracy. Take, for example, the translation of the *Mahábhárata*, now being published by Babu Protap Chandra Rai. Unfortunately he is himself unable to supervise it or to procure European supervision, and is thus at the mercy of the actual translator, who, though apparently fairly competent as regards knowledge of the language, is sadly wanting in judgment. His version professes to be literal, but in many passages it is so loose that it might rather be styled a paraphrase, and is seldom a thoroughly trustworthy representation of the original.

Architectural restorations may be conducted almost entirely through Native agency. The Masons' guilds at Agra, Muthura, Gwalior, and other places comprise a large number of skilful and experienced architects, fully competent to carry out any work with which they may be entrusted. They have a far more exact traditional knowledge than is often supposed of the different indigenous styles, both of earlier and later date, and, when they please, they can reproduce their characteristic features with more facility and certitude than the best-read European. The less interference with them the better, but at the same time *some* European supervision is absolutely necessary; otherwise they are likely to exceed the limits of conservative restoration, and to introduce modern improvements of their own. It must be remembered that restoration, in our sense of the word, is an idea of exclusively European and strictly modern development. In the middle ages repairs and additions to any historical building were invariably in the style then prevalent, and not in the style of the original fabric. It is the same with ourselves now in engineering works, which we destroy or alter without hesitation, knowing that we can replace them with something better. In Art, being less confident of our power to create, we are rightly more studious to preserve.

In addition to architects and builders, Natives are also, as a rule, to be preferred to Europeans as Archæological Draftsmen. If they have been trained in their fathers' workshop and not in a Government school, they have a freer touch, and, with somewhat less of mechanical accuracy, are really more truthful in their reproduction of the *nuances* of Oriental design. Men of these classes are suffering greatly from the want of State encouragement; and if, as I recommend, the existing Archæological Department is abolished, they might be largely benefited by the retrenchment: for funds would then be available, not only for the patronage of special literary undertakings, such as those in which Mr. Fleet and Mr. Vincent Smith are now engaged, but also for the equally important business of monumental conservation, in which Natives would be employed almost exclusively.

No. II—Raja Rajendralal Mitra, Bahadur, LL.D., C.I.E.

Raja Rajendralal Mitra.

I have the honor to submit the following remarks with reference to the employment of competent persons in the Archæological Department of the Public Service.

India.

Archæological Survey.

Section IV.

Raja Rajendralal Mittra.

The Department in question is a small one, and the service required from the officers employed in it, mere Clerks and Assistants apart, is of a highly technical character. It has therefore not been possible heretofore to follow any systematic plan in the selection of candidates. The only plan, if it may be called a systematic plan, is judicious selection by Government with special reference to the past career and peculiar natural aptitude of the candidates. That this has always proved satisfactory, I cannot say. On the contrary, it is abundantly evident from the past history of the Department that in several instances men have been appointed who were all but totally unfit for the work for which they were engaged.

Archæology in its widest sense includes every subject connected with antiquity or ancient things, and Dr. Prichard has gone the length of employing it in nearly the same sense as Palæontology. A more circumscribed meaning, and one in which it is often used, is that which pertains to the early history of any nation. But it has not often been so employed. At one time it was restricted to Greek and Roman Art exclusively. But generally it has been recognized to indicate the science which deduces the history of man from the relics of the past. This includes architecture, sculpture, ornamentation, numismatics, epigraphy, palæography, fine arts generally, and a variety of other subjects too numerous to be mastered by any one individual. In sanctioning the Archæological Department, the late Lord Canning found it necessary to define the object of the Department in the following words:—

"But, so far as the Government is concerned, there has been neglect of a much cheaper duty—that of investigation and placing on record, for the instruction of future generations, many particulars that might still be rescued from oblivion and throw light upon the early history of England's great dependency—a history which, as time moves on, as the country becomes more easily accessible and traversible, and as Englishmen are led to give more thought to India than such as barely suffices to hold it and govern it, will assuredly occupy more and more the attention of the intelligent and enquiring classes in European countries." * * * "What is aimed at is an accurate description illustrated by plans, measurements, drawings, or photographs, and by copies of inscriptions of such remains as most deserve notice, with the history of them so far as it may be traceable, and a record of the traditions that are retained regarding them."

The knowledge necessary for an Archæological Officer under this definition includes extensive knowledge of Indian history, historical criticism, and Indian classics, surveying, architecture, fine art, drawing, numismatics, photography, and epigraphy—all based on a 1st class general education. But no officer hitherto appointed to the Department could be declared to be an expert in all these subjects. Indeed, it was not possible for Government to obtain a sufficient number of officers possessed of the necessary qualifications.

It is an ungracious task to refer to the qualifications of officers who now are, or lately were, in the service—it is worse: it is offensively personal. It is therefore with the greatest reluctance that I approach it. Would I could avoid it altogether.

But the enquiry the Sub-Committee is engaged in cannot be satisfactorily accomplished without adverting to the past. The disease must be known before a proper remedy can be applied. To a certain extent the unpleasantness of the task is, however, as far as I am concerned, removed by a book on "Indian Archæology" published two years ago by the late Mr. Fergusson, who was universally admitted to be the highest authority on the subject. Commenting in it on the operations of the Archæological Survey of India, he says (page 76):—

" * * * himself is no architect, and does not pretend to be one. Except as a copy of a photograph, the only attempt at an architectural representation that appears in any one of his sixteen volumes of reports is that of the temple of Sidnáth, near Kangra Kote (Vol. V, Plate XLIV), and it is so unlike the original, I defy any one to recognize it as a representation of this temple without the inscription on the plate to say so. Nowhere else does he attempt to show that he can make an architectual section or elevation of a building; and his Assistant, Mr. * * * , is even less accomplished in this respect than his master. The few attempts at drawing architectural details that are dispersed through his reports are more like the productions of a half-educated schoolboy than anything that would be thought worthy of publication by a full-grown man. * * *

"It seems impossible to account for his employment during so many years of so incompetent an Assistant as Mr. * * * During the fourteen years he has been employed on the Survey, he has contributed almost literally nothing to our knowledge of archæology or architectural geography. His last great effort to settle the site of Kapilavastu (Report, Vol. XII) is one of the most unsatisfactory essays of its sort that can well be conceived."

The remark made about * * * may be with every propriety applied to another officer, who * * * * was appointed to the rank of an Assistant. He brought none of the qualifications necessary for his new post. Schoolmasters have also been appointed for survey operations, for which they possessed but a slender fitness. Even * * * * is no exception. * * * He does not know the Indian classics sufficiently to be a competent Oriental Epigraphist; he has published no drawing to show that he is a proficient Draftsman, and he was not brought up as an Archæologist. To his credit I must add, however, that by earnest devotion to his work he has acquired some of the principal qualifications needed, and is, with the assistance of experts, now doing his work in fair way.

The qualifications I have noted at the end of paragraph 3 call for some explanations. All the branches of knowledge there noted cannot readily be found in perfection in any one individual, and it would indefinitely postpone all archæological research were we to wait for the discovery of such a paragon of

learning. Nor is it necessary that all the different branches should be mastered to perfection before any enquiry can be undertaken. Some of the branches are of greater importance than others, and in this as in other affairs of the world a good deal may be effected by division of labour. For instance, an Archæological Surveyor may well utilize the researches of professional numismatists without himself being an expert in the subject. Surveying, too, may be carried on by Assistants without in any way affecting the value of their work. Of architecture, fine art, drawing, he must have a good general technical knowledge, though it is not necessary that he should be a first class architect, or an accomplished sculptor, or an unexceptionable draftsman. He should be a good judge of art-work and able to notice all technical peculiarities, though he may not excel in the execution thereof. In Palæography he must be a master, or he will too often betray his unfitness for his work; and the Indian classics form an integral part of Epigraphy. Of the importance of 1st class general education I need say nothing: it is self-evident. I attach equal importance to a knowledge of Indian history and the rough aptitude for historical criticism. No man can be fit for archæological research who is not possessed of a high order of historical acumen, thoroughly trained by long practice, and, above all, a natural zeal for work of this kind—a disposition of the mind which takes a delight in such research. No one who is not possessed of it should be appointed an Archæologist.

These remarks point to the necessity of the utmost caution and circumspection in the selection of officers for the Archæological Department. No person should be appointed who is not fully qualified, both by training and past experience, to discharge the duties of the Department without requiring any apprenticeship; and this can be done only by careful selection. Men who have already gone through their noviciate, who have a natural inclination for antiquarian studies, who have as amateurs acquired proficiency in their work and established their reputation, are the only men who are fit for work in this Department. These can be got only by search and careful enquiry, and private recommendations and personal kindness should not be allowed any play in making the selection.

It is true that favoritism can best be defeated by public competition, but I cannot recommend it in the case under notice. There are not a sufficient number of qualified men in the market to give any chance for a good selection by public examination, and the number of posts available in the Department is so small that it is hopeless to expect that the institution of an annual examination will offer sufficient temptation to people to qualify themselves for it, or enable the Government to avoid disappointing those who may successfully pass the test. Were the case otherwise, I would still object to competition. What are wanted are fully competent officers of proved merit, and not novices; and by competitive examinations we can have, generally speaking, only novices.

It might very plausibly be argued that men first employed in any Department must go through their noviciate and gradually acquire the necessary qualification for the satisfactory discharge of their duties, and that the Government should be prepared for it. But the argument fails in the present instance. Even as in the despatch of public business we cannot accept, on the ground of inexperience of an analyst, a faulty or doubtful analysis of the contents of the stomach in a case of poisoning, so is the case with regard to an Archæological Survey. Dr. Medlicott, in his letter on the subject of employing inefficient Assistants in the Geological Survey, puts the case very pointedly, and I would have here reproduced his arguments to strengthen my position; but I believe the letter is already before you. Work like that of the Archæological Survey can be done only once for all; and, if it is not done well, it is utterly worthless—nay, it is worse, for it produces an amount of error that entirely confounds history. The enquiry should be conducted by competent, fully trustworthy persons, or it should not at all be made. It is infinitely better that the public should remain in entire ignorance of the history of any one particular relic than that such history should be enveloped by a mass of errors got up by order of Government.

The Department is of so technical a character that the question of claims to service of particular sections of the community cannot be permitted to have any influence in connection with it.

No. III.— J. L. Kipling, Esq., C.I.E., Curator, Central Museum, Lahore.

The field of enquiry suggested by the 5th paragraph of the Government Resolution on the Public Service Commission is so wide that I have some difficulty in giving an opinion as to its bearing on the Archæological Survey of India.

The results of Archæological inquiry in India might be of the greatest value to scholars engaged in historical research; but they are worse than useless if they are not the work of men of first-rate scientific authority. Much that has hitherto appeared as Indian Archæology under the auspices of the Indian Government has but little value, and there are whole volumes that should never have been published at all.

With regard to the question as to what races make the best Archæologists, it must be remembered that the science in its present state is entirely new and distinctively European. There can be no reasonable doubt that Western scholars are the best Archæologists, and that to serve any useful purpose the direction of the Indian Survey must be in their hands.

India.

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Section IV.

J. L. Kipling, Esq.

Considering Archæology in its relation to architecture, the most valuable help that can be rendered by Natives of India is the reproduction by measuring and drawing of ancient monuments. The *mistri* and artisan classes are admirably fitted for this important work. They have a natural affinity for constructive design, and it is probable that the Indian architect of the future will come from this class. Such men trained in the Schools of Art of Bombay and Lahore have done, and are now doing, excellent work. Their employment on a more extensive scale, I consider, would be of great advantage in an educational sense and in other ways that need not be dwelt on at length.

Indian Archæology has much to do with the history of letters, and indeed with history in its broadest aspects. It has been shown in Bengal and Western India that scholars of Native birth are capable of good work in palæography and kindred studies. But in the Punjab there is a total absence of interest in the literary phase of the study of antiquities. Since, however, it is possible to inspire men belonging to the constructive races with some appreciation of the beauties of old architectural forms, the scholarly side of the subject might, perhaps, be taken up if it were taught to the clerkly classes. But as this kind of study, more than any other, demands for its successful prosecution special tastes and distinct natural affinities, the present state of things in the Punjab is more discouraging to the prospects of archæology than can be briefly expressed.

I have no knowledge of, nor interest in, questions of departmental organization, promotion, or pay, and these relatively trivial details can have but small concern with a special scientific branch in which the best man has a right to the best place, wholly irrespective of ordinary departmental rules.

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